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ABSTRACT

This report is the 2-year followup evaluation of a proposed 4-year grant, studying the effects of a sequential learning program on disadvantaged children. Four- and 5-year-olds (N=86) were matched on several developmental variables, with one group at each age entering the Learning to Learn Program at either the nursery or kindergarten level. The other two groups served as controls and entered day care centers or traditional type kindergartens. During the second year of the project the experimental groups either attended kindergarten or first grade at the Learning to Learn School, and the control groups attended either Title I kindergarten or traditional first grade classes in public schools. Experimental and control groups were tested on measures of intelligence, psycholinguistic ability, visual motor ability, primary mental abilities, readiness and achievement. Results indicate that the children who began the program at age 4 have made much larger developmental gains than children in the matched control group. To a lesser extent, the children who began the program at age 5 have advanced more rapidly than their control group. An appendix gives individual raw data collected, descriptions of tests used, and rating scales. (Author/NH)

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Currently there is considerable attention focused on the development of new curricula and materials for early childhood education. The impetus for this interest comes from (1) the need for new programs for the culturally deprived child and (2) the evidence from recent research which questions some present assumptions concerning the optimal environment for the overall development of the child.

One questionable assumption is that the child is not ready to think, reason, or deal with organized learning material until the primary grades. This assumption has been vividly expressed by Rudolph and Cohen (1964) who state ". . . children of kindergarten age are not quite ready for organized, sequential, academic instruction in reading, writing, and arithmetic, largely as a matter of their overall development at age five. . . . teachers of young children are morally bound to protect the rights of every generation to normal maturing (p. 380)." Recent evidence (Bruner, 1960, 1966; Caldwell, 1968; Hess and Bear, 1968; Ojemann, 1963; and Wann, 1962), however, inidcates that the young child's strength, potential, and desire to learn have been underestimated.

A second such assumption is that the major function of early education is to facilitate the social and emotional development of the child, with comparatively less emphasis on cognitive development. This leads to school programs that focus on socialization, school readiness skills, and an abundance of unsequenced play experiences. A related belief of this approach is that an early childhood program focusing on intellectual development is likely to occur at the expense of the child's social and emotional development. This criticism has been answered by Robinson (1968)

who states "it is difficult to see how pleasant experiences, stimulating within reasonable limits, can be harmful either to mental health or to cognitive development. One need not deny that sound emotional development is important to contend that optimum intellectual growth is also important. The two are apparently intertwined, with development in the emotional sphere, in part a function of development in the intellectual realm, and vice versa (pp.44-45)."

The third assumption or approach in question is that the young child must initially acquire factual knowledge or content in order to develop adequate learning skills for later school success (Bereiter and Engelmann, 1966). However, in an increasingly complex world it may well be that the abilities to solve problems and to creatively explore the universe are more fundamental than the ability to accumulate present knowledge. Therefore, the child must learn how to learn in addition to learning content.

In view of recent research and thinking it seemed worthwhile to design and operate an early childhood education program organized so that it (1) is appropriate to the stage of cognitive development of the child, (2) makes maximal use of the child's abilities, (3) uses a planned sequence of environmental stimulation based on a knowledge of the stages of cognitive development, (4) emphasizes the process of learning, (5) guides and structures the learning experiences rather than presenting the child with a large amount of random, unorganized stimulation.

The purpose of this project was to continue the sequential learning program begun in September, 1968, with four- and five-year old children. The long term plan was for these children to be kept in a continuous sequential program through the first grade. The project has two separate

aspects. One is the application of the Learning to Learn Program at the laboratory school. The second is the evaluation and follow-up of this project. The purpose of the evaluation study is (1) to compare and contrast the development of the children who receive a two year preschool program (Group E_4 - those who began the sequential program at age four) with those who receive a one year preschool program (Group E_5 - those who began at age five); (2) to compare and contrast the development of the experimental groups with that of the control groups (Groups C_4 and C_5) who were matched with the experimental groups in intelligence, language ability, perceptual-motor ability, and socio-economic status.

Another aspect of this project is a systematic attempt to learn how differing lengths of exposure to the Learning to Learn Program influence the child's learning. This is of significance because there is a real question about the lasting effects of early education programs for children from a lower socio-economic background. This project may determine whether the commonly found loss of developmental gains after leaving special programs can be avoided by providing these children with longer exposure to a special early education program. Thus the overall design calls for one group of children to be in the Learning to Learn Program for three consecutive years, and another group for two consecutive years. There are data already available of the effects on a group who were in the program for one year of kindergarten after which they entered primarily black neighborhood schools. (See OEO Reports on Contract No. 1389 and Contract No. B89-4425). It is hoped that the long term effects of exposure to a sequential program can be assessed by following these children as they progress through school.

Several other early education programs have been developed, each differing considerably from the Learning to Learn Program. These programs have been described elsewhere and a description of them and comparison with the Learning to Learn Program is not feasible here. Some excellent sources for these programs are: Hess and Bear, 1968; Caldwell and Richmond, 1964; Deutsch, 1965, 1967; Gray and Klaus, 1965; Klaus and Gray, 1968; Rambusch, 1962; Weikart, Kamii, and Radin, 1964; Hechinger, 1966; Bereiter and Engelmann, 1966.

Objectives

The objectives of the demonstration program are as follows:

1. to complete a two year and a three year continuous sequential curriculum based upon concepts and structures which have been identified as basic to the overall development of young children.
2. to change the traditional role and function of the teacher as follows:
   a. from lecturer and instructor to evaluator
   b. from expository teaching to teaching via inquiry and exploration.
3. to change the traditional role and function of the pupil by emphasizing:
   a. greater development in cognitive control; i.e., attention, concentration, delay before responding, reflection, etc.
   b. more persistence and effort on achievement tasks
   c. greater skill in developing strategies to solve problems and in making decisions
   d. more balanced development of academic, recreative, and social skills.

4. to accommodate individual differences in the rate and level of learning by the use of small group and individual learning situations.
5. to involve parents in the education and cognitive development of their children by pointing out specific methods, techniques and activities which can be used at home to facilitate the learning process.
6. to provide the teacher an opportunity to work with small groups and individual students by utilizing teacher assistants.

The Theoretical Basis of the Program

The Learning to Learn Program was conceived and developed on the premise that the primary objective of early childhood education is to help the child learn to learn. This premise leads to the following eight basic principles or premises underlying the Learning to Learn Program:

(1) The child must be an active participant in the acquisition of knowledge and be given a major share of the work in the learning situation. Active physical, verbal, and mental participation of the child whenever possible is encouraged.

(2) The child must receive feedback that the application of his knowledge has made a contribution to himself and someone else. Such a realization builds self-confidence and self-worth. This feedback can be in the form of praise for appropriate learning activity, clues as to how to go beyond where he is with a task, correction of errors, etc.

(3) The internal satisfaction and feelings of adequacy that develop from the knowledge that he can cope with and master his environment stimulate the child's growth toward independence and achievement. The

child is therefore encouraged to do as much learning as possible by discovery through his own activity.

(4) Learning becomes more meaningful to the child when it is in the form of a problem which challenges him and sparks his curiosity. The emphasis is placed on the process of problem solving and not on the accuracy of the solution. Such an approach encourages decision making and the development of flexible cognitive sets and strategies for learning without fear of failure and disapproval.

(5) The verbal symbols, concepts, skills and attitudes learned will more readily become a part of the permanent repertoire of intelligent behavior if they are immediately useful and helpful in the child's everyday world. Therefore, the content of the curriculum is built around material from the child's environment.

(6) The child must be exposed to opportunities for the interaction of multiple sensory and motor activities and the accurate labeling and communication of the information received. Each new learning task is presented through as many sense modalities as is possible. The child is usually fascinated with the realization that he can internalize an external process, organize it, and then report it to a listener who understands the logic of his thoughts. This is especially intriguing when the data processed are from sources other than the eyes and ears.

(7) Learning experiences for the child take on value not in mere exposure but in their timing, continuity, and the ways they are structured. Each new learning task is built on previous tasks and goes one step beyond them. Appropriate timing and sequencing of experiences regulate the amount and intensity of stimulation, provide an atmosphere that lends

itself to attention, concentration, and greater sensitivity to the structure of the experiences. This approach assures that the child is moving forward by providing a hierarchical structure of learning experiences.

(8) Motivation to keep the child interested in the learning materials is accomplished by presenting most of the learning in game form where the child is an active participant in the game.

These eight principles have been shaped by a knowledge of child development, education, learning, and by daily observations of teachers' and children's behavior and their interaction during the four year experimental use of the Learning to Learn Program.

The organization of the Learning to Learn Program was built on the assumption that cognitive growth and development proceed in an orderly sequence with periods of transition. It was assumed, on the basis of past research, that the sequence proceeds from motor to perceptual to symbolic aspects of cognitive functioning. In the motor stage the child's first cognitive working concern is in manipulating the world through actions. By establishing a relationship between experience and action, the child becomes aware of certain surface features by which he can identify the objects with which he works and the world around him. Through his perception of the world around him he learns the relationships between the various things he observes. He must be given the opportunity to perceive, recognize, categorize, and discover relationships. This leads to the stage of symbolic formation which enables the child to talk about and deal with things and ideas in the abstract, or in the absence of any tangible objects or relationships. With the acquisition of the ability to communicate verbally comes the capacity to recall the past, represent the present, and to think about the future and the "possible." Language becomes a vitally

important tool for thinking, reasoning, and communicating things that the child has not said or heard before.

With the establishment of the program within a theoretical framework, the next essential step toward putting the theory to work was to determine where most four- or five-year-olds are with respect to their development. Psychological and educational literature provided quite clear evidence in this regard. A more challenging step was the necessity for translating theory and research into practical content which would facilitate a child's progress through the developmental sequence.

The natural choice for something to motivate, stimulate, and appeal to children was the use of games or a game atmosphere. The games employed in this program were constructed around five content areas (clothing, food, animals, furniture, transportation) and chosen because examples of this content are familiar to children of all socio-economic backgrounds and because they are readily available as real or miniature three-dimensional objects.

By beginning with a few examples of each content area and gradually expanding to include more members of the class, it was possible to develop a variety of games and activities, each of which is one step beyond the previous one and each of which incorporates the experiences and knowledge acquired by the child. Each of the five areas is sequenced in such a way that it is revisited and repeated in a variety of ways. Each time, however, the game or activity becomes less concrete and more abstract. The real orange, for example, is replaced by a picture of an orange as the only stimulus, and finally, the games are highly verbal and require statements about an orange. Every game or activity engages the child in some kind

of active interplay of manipulation, perception, and verbalization.

This gradual transformation of overt action into mental operations is a direct consequence of Piaget's key tenet that stable and enduring cognitions about the world come about only through a very active commerce with this world on the part of the knower (Flavell, 1963, p. 367).

It should be pointed out, however, that the goals of the program go beyond competence in manipulating language. The program gives the child an opportunity for the development of strategies of gathering information, problem-solving, and decision making. The skills and concepts children acquire are as follows:

1. Information gathering and processing through the use of all the senses
2. Observation, identification, and labeling of objects
3. Attention to and concentration on attributes that discriminate one object from another (what makes a pear a pear)
4. Classification
5. Identification of classes and sub-classes
6. Identification and classification on the basis of reduced clues
7. Encouragement by the use of guesses and hunches
8. Decision making
9. Use of past learning to make decisions
10. Problem solving
11. Reasoning by association, classification, and inference
12. Anticipation of events and circumstances
13. Expression of ideas
14. Imagination and creativity

15. Conventional (in contrast to idiosyncratic) communication
16. Operations on re ationships
17. Exploration of numbers and space

It can be seen that while the program exposes children to experiences that will gently nudge them along in their development, it also equips them with tools and techniques which enable them to learn how to learn. The emphasis on creative exploration is in vivid contrast to Montessori programs which restrict the child to classification and description of the world around him. An important advantage of the Learning to Learn approach is that it makes the child more independent since his past experiences help him master new situations. His greater maturity is evident in his increasing reliance upon his own resources and decreasing dependence on the teacher. He experiences tremendous satisfaction from the knowledge that he knows how to solve problems and to grow independently.

Two teachers, and two classroom areas are necessary. One room is large enough to accommodate a class engaged in a variety of activities. A smaller room is used by one teacher for short sessions devoted to the planned sequential activities. Here the size of the group is limited to four children who are homogeneous with respect to level and rate of learning. The careful use of groups is in accord with Piaget's second major implication for education.

> "If social cooperation is thus one of the principal formative agents in the spontaneous genesis of child thought, it is an imperative necessity for modern education to make use of this fact by according an important place to socialized activities in the curriculum." (Aebli, 1951, p. 60)

Considerable emphasis is placed on the creation of a favorable learning atmosphere. The other children must show the learner (player) respect by being quiet so he can "think with his brain" (make observations, organize information and also his thoughts before responding). With such an emphasis it soon becomes apparent to the child that he is important and that what he is trying to achieve is worthwhile.

For a more complete description of the Learning to Learn Program including the step by step curriculum, program content, teacher instructions, etc., the reader is referred to Sprigle (1967) and Sprigle (1969).

Design of Project

During the 1968-69 school year two groups of children entered the experimental program and two control groups were selected. (See Figure 1)

Figure 1

Design of Project

Year	Grade	Age	Group Status		Grade	Age	Group Status	
1970-71	1st**	6	E^*_4	C_4	2nd**	7	E_5	C_5
1969-70	K	5	E^*_4	C_4	1st	6	E^*_5	C_5
1968-69	N	4	E^*_4	C_4	K	5	E^*_5	C_5

Disadvantaged Children

E_4 N = 23 E_5 N = 21

C_4 N = 21 C_5 N = 21

* In Learning to Learn Program
** Data to be collected Spring of 1971
E Experimental groups participated in Learning to Learn Program during nursery, kindergarten and 1st grade.
C Control groups had either a combination of traditional day care, nursery, kindergarten, or elementary school experience.

Subjects were drawn from the same disadvantaged neighborhood in Jacksonville. Two five-year-old groups were selected with the experimental group (E_5) attending the Learning to Learn School and the control group (C_5) attending public school kindergarten in Duval County. Two four-year-old groups were selected with the experimental group (E_4) attending the Learning to Learn School and the control group (C_4) attending OEO sponsored day care centers in Jacksonville. During the 1969-70 school year, group E_5 was in first grade at the Learning to Learn School, group C_5 was in first grade in Duval County public schools, group E_4 was in kindergarten at

the Learning to Learn School and group C_4 was in kindergarten in Duval County public schools. During the current year, 1970-71, groups E_5 and C_5 are attending second grade in Duval County public schools, group E_4 is in first grade at the Learning to Learn School, and group C_4 is in first grade in Duval County public school. The evaluation report for this project is on the data collected on all four groups following the first two years of the project (through spring 1970).

The evaluation and data collection relating to the third year of the project is currently underway and will be completed during 1970-71 school year.

Objectives and Hypotheses of the Evaluation Program

The purpose of this follow-up study is to determine the differential development of the four groups of children, E_4, C_4, E_5, C_5 at the end of kindergarten (E_4 and C_4 groups) and at the end of first grade (E_5 and C_5 groups).

It is hypothesized that the children participating in the Learning to Learn Program (E_4 and E_5 groups) will be developmentally superior to the children in the control groups (C_4 and C_5 groups) as measured by a wide variety of developmental measures. It is further hypothesized that:

1. Group E_4 will be developmentally superior to group E_5 at the end of the Learning to Learn Preschool Program (through kindergarten).

2. Group E_4 will be developmentally superior to the control group C_4 at the end of each year of the preschool program.

3. Group E_5 will be developmentally superior to control group C_5 at the end of the preschool program (post kindergarten) and the first grade.

Specific Hypotheses

The specific hypotheses for the second year of the project are that at the end of kindergarten in the Learning to Learn Program, group E_4 will be superior to the control group C_4 and that at the end of first grade group E_5 will be superior to group C_5 in the following developmental characteristics:

(1) general intelligence

(2) ability to express ideas

(3) language comprehension

(4) verbal reasoning ability

(5) concept formation

(6) creativity and imagination

(7) achievement motivation

(8) school achievement

(9) parental involvement and attitudes in the education of their child (Groups E_5 and C_5 only)

Instruments

The instruments that were used to measure the developmental characteristics of the children at the end of the second year of the program were as follows:

Developmental Characteristics	Instruments
1. General Intelligence	Stanford Binet Intelligence Scale Form L-M (Terman and Merrill, 1960)
2. The ability to express ideas	The Illinois Test of Psycholinguistic Abilities (McCarthy and Kirk, 1961) Vocal Encoding Subtest

Developmental Characteristics	Instruments
3. Language comprehension	The Illinois Test of Psycholinguistic Abilities Auditory-Vocal Association Subtest
4. Verbal reasoning ability	The Illinois Test of Psycholinguistic Abilities Visual-Decoding Subtest
5. Concept formation	The Illinois Test of Psycholinguistic Abilities Visual-Motor Association Subtest
6. Language quality, performance, creativity and language imagination	Ratings of stories made by children
7. Achievement motivation	Ratings by teachers and observation
8. School achievement	The Stanford Achievement Test
9. Parental attitudes and involvement in the education of their child	Parental Questionnaires (groups E_5 and C_5 only)

In addition the following tests and measures were also administered:

Bender Gestalt (E_5, C_5, E_4, C_4)

Primary Mental Abilities (E_5, C_5)

Metropolitan Readiness Test (E_5, C_5)

Mathematics Performance Measure (E_5, C_5)

Sprigle School Readiness Screening Test (E_4, C_4)

Population and Sample

During the months of May and June, 1968, the children were identified through the school systems in the poverty areas, through contact with churches in the poverty areas, and by public announcements inviting parents who met the criteria to apply for enrollment in the program. The assistance of the welfare department and pediatricians in the community was also used to identify eligible families. The children for all four groups were selected from homes in the same deprived neighborhood of Jacksonville, Florida.

With a few exceptions, the parents were employed at an occupational level below white collar worker. The initial testing and screening of subjects was conducted during the summer of 1968 at the Learning to Learn School in Jacksonville, Florida.

The subjects who participated in this project consisted of 44 four-year-old children and 42 five-year-old children.

Figure 2

Schematic Diagram of Experimental and Control Groups

Age 4 (started at nursery school level)	E_4 (N = 23)	C_4 (N = 21)
Age 5 (started at kindergarten level)	E_5 (N = 21)	C_5 (N = 21)

The children from each age level were divided into two groups (see Figure 2) matched on intelligence and perceptual-motor skills. (See Table 1 and 2).

Group E_4 consisted of 23 children who attended the Learning to Learn Program from September, 1968 through May, 1970 (beginning at age 4). These children have been exposed to two school years of the Learning to Learn Program (nursery and kindergarten) and will participate in the Learning to Learn School's planned sequential first grade program during the 1970-71 school year.

The group C_4 (the control group for group E_4) consisted of 21 children (beginning at age 4) who attended day care centers during the 1968-69 school year. During the 1969-70 school year the C_4 children attended Title I kindergarten classes in the Duval County school system, and are currently attending first grade in that school system.

Group E_5 consists of 21 children (beginning at age 5) who were exposed to two consecutive years of planned sequential preschool program at the Learning to Learn School (kindergarten and first grade). These children are currently enrolled in the second grade in the Duval County school system.

Group C_5 (the control group for group E_5) consists of 21 children (beginning at age 5) who participated (during 1968-69) in a Title I kindergarten program in the same neighborhood from which the experimental subjects (E_5 group) were drawn. During the 1969-70 school year the C_5 group attended first grade in the Duval County school system and are currently (1970-71 school year) enrolled in the second grade in that school system.

To control for intelligence and perceptual motor skills the two groups of four-year-old children (E_4 and C_4) had been matched at the beginning of the project (1968-69) on their performance on the Stanford Binet Intelligence Scale and the Seguin Form Board. A comparison of the scores of the two groups on these measures is presented in Table 1.

Standard Abbreviations for Tables

Group = Grp.
Months = mths
Years in Experimental Program = YIEP
Pre-Nursery = Pre-N
Pre-Kindergarten = Pre-K
Post-First Grade = Post-1st
Mean Intelligent Quotient = $\bar{X}$ IQ
Mental Age = MA
Chronological Age = CA
Mean Age = $\bar{X}$ Age
Post-Nursery = Post-N
Post-Kindergarten = Post-K

Table 1

Pre-Program Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_4) and their Controls (C_4) on the Stanford Binet and Seguin

Measures	Grp.	N	$\bar{X}$ Age (mths)	YIEP	$\bar{X}$ [redacted] Score	S.D.	t	
Stanford Binet	E_4	23	51	0	87.65	11.86	-0.16	N.S.
	C_4	21	49	0	88.14	6.96		
Seguin (time score)	E_4	23	51	0	75.78	28.18	1.01	N.S.
	C_4	21	49	0	66.38	32.23		

The two groups of five-year-old children were also matched as closely as possible on the Stanford Binet, in school readiness skills as measured by the School Readiness Screening Test, and on two subtests from the Illinois Test of Psycholinguistic Ability. These data are presented in Table 2.

Table 2

Pre-Program Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_5) and their Controls (C_5) on the Stanford Binet, ITPA, SRST, and the Seguin

Measure	Grp.	N	$\bar{X}$ Age (mths)	YIEP	$\bar{X}$ [redacted] Score	S.D.	t	
Stanford Binet	E_5	21	62	0	89.71	9.54	0.03	N.S.
	C_5	21	62	0	89.62	8.18		
ITPA - Vocal Encoding	E_5	21	62	0	9.33	2.75	-0.22	N.S.
	C_5	21	62	0	9.57	3.89		
ITPA-Auditory-Vocal Assoc.	E_5	21	62	0	8.24	2.51	0.19	N.S.
	C_5	21	62	0	8.05	3.64		
SRST	E_5	21	62	0	10.57	3.58	0.31	N.S.
	C_5	21	62	0	10.24	3.19		
Seguin (time score)	E_5	21	62	0	49.05	18.61	0.75	N.S.
	C_5	21	62	0	44.67	18.39		

The experimental and Control groups did not significantly differ on any of the measures. The test scores for each subject are given in Appendix A.

Procedure

During the 1969-70 phase of the research program the E_4 group attended a three and half hour morning kindergarten session. The session was divided into two major blocks of time. The first hour and a half was devoted to exposing the children to a balance between formal learning activities and a work-play situation in which the child chose his own activities. During this block of time each child had approximately one half hour of formal learning in a "game atmosphere" and one hour of free choice activity.

The second half of each session, after a snack and a short rest period, was spent engaging the children in activities that involve both large and small body movements. These activities were also carefully planned and had a definite learning function. The research design calls for these children to be continued in the program at the Learning to Learn School through the first grade. The first grade curriculum has been developed and tested with with kindergarten curriculum.

For a more complete description of the experimental program see Sprigle (1968) and Sprigle (1970).

The children of the C_4 group were members of three different kindergarten classes in the public schools during the 1969-70 school year and were exposed to traditional kindergarten programs. They attended programs consisting of group and individual activities designed to expose the children to a large variety of stimulation, concepts, and ideas. The programs emphasized self-help, socialization, and sensory-motor and language experience. These activitie.

however, were not based on the developmental sequential program designed to teach children how to learn. In addition, these children viewed the Sesame Street television program for one hour each day and the follow-up materials published by Sesame Street were used.

The E_5 group attended first grade in the demonstration project. The program was designed to provide continuity with the kindergarten program and establish early childhood education as the beginning of an educational process that brings consistency into educational planning.

The large classroom was divided into learning areas, each with a variety of materials. There were listening, reading, typing and general activity areas. The latter was the larger area and had the tables and chairs in clusters of four to accommodate four children.

The children had freedom of movement and freedom of interaction during the school day. However, accompanying their freedom was a responsibility to themselves and others in the classroom. Their behavior and movement could not be disrupting or distracting to classmates and the teacher. The children had to select from and get involved with the activities and materials provided in the classroom or materials brought from home but which were relevant to the learning objectives.

The curriculum and curricular materials were structured and sequential and continuous with the kindergarten program. The major focus of the first grade curriculum was on the understanding and use of language (reading, writing, listening, speaking) and mathematics. There was frequent use of art as a means to creative writing and expression. Social studies and science were woven into the language and math activities.

Each child had a folder with work that had to be completed by the end of the day. The teacher and aide were guided by the needs of each child and his developmental status when making decisions about the day's work. Consequently, not all children had the same work or same amount of work.

The children were permitted to pace themselves in getting this work finished. They could pause to pursue another activity in another learning area, just so long as their work load was completed by the end of the day. In addition to the work in the folder, they had an assignment at the listening, reading, and typing areas. The work of these areas was highly coordinated so that the learning activity on the listening tapes was related to the typing activity and reading and language activity.

The roles of the teacher and aide were quite similar to their roles in the kindergarten program. There was no direct, instructional teaching of the traditional variety where the teacher is in front of the whole class. Instead, the teacher or aide worked with small groups of 4 or 5 children, usually on the floor or rug. While one was engaged in a small group learning activity, the other was available to the remaining children on an individual basis. Her job was to move about the classroom helping children who came to her, going to children whom she knew needed help getting started or changing from one activity to another. She also got small groups started at the listening tapes and sent small groups to the typewriter. Her other job was to maintain an interpersonal climate conducive to learning.

The children in the control group, C_5, were part of a larger regular first grade class in the public school system. In addition to the teacher, a full-time teacher's aide was employed in the classroom. The teacher's manner was pleasant and she was knowledgeable in the use of currently

accepted teaching techniques; for example, reading was taught in small groups. During these sessions the other children were seated at tables with workbook assignments. The aide maintained order and did the necessary clerical work. The activity level of the classroom was relatively low, with the children reminded regularly to sit down in their seats and work quietly. A television set was used for whole group instruction in such areas as art, social studies, and music. After the television presentation, follow-up assignments were given. The teacher made some use of games as teaching materials but they followed no planned sequence of structure or content.

In the spring of 1970, following the completion of the major parts of the training programs, all subjects were evaluated with the developmental instruments. The examiners consisted of a research team from the University of Florida.

The test material has been checked and the scores retabulated by the director or co-director of the evaluation study to insure that scoring, administration, and test evaluation was done properly.

Results

Comparisons between the E_4 and C_4 Groups on the Stanford Binet

The means, standard deviations, and *t* values between the experimental (E_4) and control (C_4) groups on the Stanford Binet taken at the end of the kindergarten year (1969-70) are presented in Table 3. The E_4 group's Binet IQ scores were significantly higher than the control group ($t = 4.33$, $P < .001$) at the end of their kindergarten year.

Table 3

A Post Kindergarten Comparison between the E_4 and C_4 Groups on the Stanford Binet

Measure	Grp.	N	$\bar{X}$ Age (mths)	YIEP	$\bar{X}_{1970}$ IQ Post-K	S.D.	*t*
Stanford Binet	E_4	23	70	2	108.55	13.29	4.33***
	C_4	21	69	0	93.45	9.08	

*p <.05
**p <.01
***p <.001

A pre-post comparison between the E_4 and C_4 groups on the Stanford Binet taken at the beginning (1968) and at the end of the second year of the project is presented in Table 4.

Table 4

A Pre-Post Comparison between the E_4 and C_4 Groups on the Stanford Binet taken at the beginning (1968) and at the end of two years (1970) in the project

Measure	Grp.	N	$\bar{X}$ Age (mths)	YIEP	1968 $\bar{X}$ IQ Pre-N	$\bar{X}$ Age (mths)	1970 $\bar{X}$ IQ Post-K	$\bar{X}$ IQ Gain	$\bar{X}$ IQ diff.	t
Stanford Binet	E_4	23	51	2	87.65	71	108.55	20.90	15.59	7.40***
	C_4	21	49	0	88.14	69	93.45	5.31		.28 N.S.

***p < .001

The E_4 group's mean IQ gain over their two years in the Learning to Learn Program was approximately 21 IQ points while their control group C_4, gained approximately 5 IQ points over the same period of time. Thus with the pre-program mean IQ's of the groups being essentially the same (E_4, 87.65; C_4, 88.14) the mean IQ points difference between the two groups after two years is approximately 15 IQ points.

Tables 5 and 6 represent pre-post yearly comparison of the E_4 and C_4 groups in relation to Stanford Binet IQ gain. Table 5 represents the kindergarten school year (second year of the Learning to Learn Program) 1969-70, while Table 6 represents the nursery school year (first year of the Learning to Learn Program) 1968-69.

Table 5

A Pre-Post Comparison between the E_4 and C_4 Groups on the Stanford Binet during the 1969-70 School Year

Measure	Grp.	Post-N N	Post-N $\bar{X}$ Age (mths)	YIEP	1969 $\bar{X}$ IQ Post-N	Post-K $\bar{X}$ Age (mths)	YIEP	1970 $\bar{X}$ IQ Post-K	$\bar{X}$ IQ Gain	$\bar{X}$ IQ diff.	t
Stanford Binet	E_4	23	60	1	107.36	71	2	108.55	1.19	15.10	.48 NS
	C_4	21	58	0	86.55	69	0	93.45	6.90		3.48***

***p < .005)

The E_4 group during the second year of the Learning to Learn Program (refer to Table 5) did not significantly increase their IQ in comparison to the previous year. ($\bar{X}$ IQ point gain = 1.19, $\underline{t}$ = .48 NS). However, it should be pointed out that the E_4 group maintained a fairly high IQ of 108.55 after two years in the Learning to Learn Program. The C_4 group during the second year of the study 1969-70 (during this period of time they attended traditional kindergarten classes in the Duval County School System) had a mean increase of 6.90 IQ points from the previous year, which was statistically significant at the .001 level ($\underline{t}$ = 3.48). The E_4 and C_4 groups were still separated by a mean IQ point difference of 15.16 points ($p < .001$, refer to Table 3).

The E_4 group after the first year of the Learning to Learn Program exhibited a mean IQ gain of 19.71 points ($\underline{t}$ = 8.02, $p < .001$). The C_4 control group during that same period of time lost 1.59 mean IQ points. These results indicate that the E_4 group made its largest gain (19.71 IQ points) during the first year of the Program and then sustained that gain during the second year, while the C_4 control group remained at about the same IQ level (-1.59 IQ points) during the first year and gained 6.90 points during the second year of the Program.

Table 6

A Pre-Post Comparison between the E_4 and C_4 Groups on the Stanford Binet during 1968-69

Measure	Grp.	N	Pre-N $\bar{X}$ Age (mths)	YIEP	1968 $\bar{X}$ IQ Pre-N	Post-N $\bar{X}$ Age (mths)	1969 $\bar{X}$ IQ Post-N	$\bar{X}$ IQ Gain	$\bar{X}$ IQ Diff.	$\underline{t}$
Stanford Binet	E_4	23	51	1	87.65	60	107.36	19.71	20.81	8.02***
	C_4	21	49	0	88.14	58	86.55	(- 1.59)		1.11 NS

***$p < .001$

Table 7 is a descriptive comparison between the E_4 and C_4 group on the Stanford Binet over time for the duration of the Learning to Learn Program to date (1968-70).

Table 7

A Comparison between the E_4 and C_4 Groups

on the Stanford Binet over time

Measure	Grp.	N	1968 $\bar{X}$ IQ Pre-N	S.D.	1969 $\bar{X}$ IQ Post-N	S.D.	1970 $\bar{X}$ IQ Post-K	S.D.	$\bar{X}$ IQ Gain
Stanford Binet	E_4	23	87.65	11.86	107.36	9.93	108.55	13.29	20.90
	C_4	21	88.14	6.96	86.55	9.37	93.45	9.08	5.31

When comparing the upper, middle, and lower thirds of the E_4 and C_4 groups (Table 8) (groupings were based on pre-test IQ) on Stanford Binet IQ over time, it becomes apparent that <u>all</u> the E_4 groups gained IQ points over time.

Table 8

A Comparison between the Upper, Middle, and Lower

E_4 and C_4 Groups based on pre-test IQ on the Stanford Binet over time (1968-70)

	Grp.	N	1968 $\bar{X}$ IQ Pre-N	N	1969 $\bar{X}$ IQ Post-N	N	1970 $\bar{X}$ IQ Post-K	$\bar{X}$ IQ Gain	t_1	$\bar{X}$ IQ diff.	t_2
Upper One-Third	E_4	8	101.3	8	111.8	8	114.3	13.0	2.88**	17.0	2.36*
	C_4	7	99.1	7	92.0	7	95.1	(-4.0)			1.97 NS
Middle One-Third	E_4	8	85.1	8	109.5	7	112.3	27.2	3.39**	16.9	7.97***
	C_4	7	87.6	7	88.1	7	97.9	10.3			3.63***
Lower One-Third	E_4	7	74.4	7	99.6	7	98.3	23.9	1.76*	17.1	4.83**
	C_4	7	81.0	7	77.7	6	87.8	6.8			2.55*

*$p < .05$ **$p < .01$ ***$p < .001$

[Upper E_4 group 13 IQ points ($\underline{t}_2 = 2.36$, $p < .05$), Middle E_4 group 27.2 IQ points ($\underline{t}_2 = 7.97$, $p < .001$), Lower E_4 group 23.9 IQ points ($\underline{t}_2 = 4.83$, $p < .01$)]. These findings did not hold true for the C_4 groups. The Upper C_4 group lost 4 IQ points over the 1968-70 period 99.1 to 95.1 ($\underline{t}_2 = 1.97$ NS). The Middle C_4 group gained 10.3 IQ points ($\underline{t}_2 = 3.63$, $p < .001$), and the Lower C_4 group gained 6.8 IQ points ($\underline{t}_2 = 2.55$, $p < .05$). When comparing the E_4 and C_5 Upper, Middle, and Lower groups on IQ gain over time (1968-70) the difference between the groups is relatively similar (Upper-one third = 17.0 IQ points difference; Middle-one third = 16.9 IQ points difference; Lower-one third = 17.1 IQ points difference). The differences between Upper, Middle, Lower E_4 and C_4 groups ranges from $p < .05$ to ($\underline{t}_1 = 1.76$ to $\underline{t}_1 = 3.39$) $p < .01$ on the Stanford Binet.

Comparisons between the E_4 and C_4 groups on Stanford Binet Mental Age (MA) are shown in Tables 9, 10, 11 and 12.

The results of Table 9 indicate that there was no difference in Mental Age (MA) between the E_4 and C_4 groups prior to the first year of the Learning to Learn Program.

Table 9

A Comparison between the E_4 and C_4 Groups on Stanford Binet Mental Age Prior to the First Year (Nursery, 1968) of the Project

Grp.	N	YIEP	$\overline{X}$ CA (Mths)	$\overline{X}$ MA (mths)	S.D.	MA diff. bet. Grps.	$\underline{t}$
E_4	23	0	51	45	6.97	0	.48 NS
C_4	21	0	49	45	5.54		

After two years of the Learning to Learn Program (Table 10) the E_4 group gained 31 Mental Age months compared to a 19 month Mental Age gain for the C_4 group.

Table 10

A Comparison between the E_4 and C_4 Groups on the Stanford Binet MA after Two Years (Pre Nursery 1968 to Post Kindergarten 1970) of the Project

Grp.	N	1968 Pre-N $\bar{X}$ CA (mths)	1968 Pre-N $\bar{X}$ MA (mths)	YIEP	1970 Post-K $\bar{X}$ CA (mths)	1970 Post-K $\bar{X}$ MA (mths)	CA Gain	MA Gain	MA diff. bet. Grps.	t
E_4	22	51	45	2	71	76	20	31	12	19.45***
C_4	20	49	45	0	69	64	20	19		13.52***

***$p < .001$

Thus after two years (1968-70) of the Learning to Learn Program there exists a 12 month Mental Age difference between the E_4 and C_4 groups.

During the second year of the Learning to Learn Program (Table 11) the E_4 and C_4 groups gained the same number of mental age months (13). There remained, however, a difference of 12 Mental Age months between the two groups.

Table 11

A Comparison between the E_4 and C_4 Groups on Stanford Binet MA during the Second Year (Post Nursery 1969 to Post Kindergarten 1970) of the Project

Grp.	N	1969 Post-N $\bar{X}$ CA (mths)	1969 Post-N $\bar{X}$ MA (mths)	1970 Post-K $\bar{X}$ CA (mths)	1970 Post-K $\bar{X}$ MA (mths)	CA Gain	MA Gain	MA diff. bet. Grps.	t
E_4	22	60	63	71	76	11	13	12	8.17***
C_4	20	58	51	69	64	11	13		11.39***

***$p < .001$

During the first year (1968-69) of the Learning to Learn Program (Table 12) the E_4 and C_4 groups had large differential gains in mental growth.

Table 12

A Comparison between the E_4 and C_4 Groups on Stanford Binet MA after One Year (Pre Nursery 1968 to Post-Nursery 1969) of the Project

Grp.	N	1968 Pre-N $\bar{X}$ CA (mths)	1968 Pre-N $\bar{X}$ MA (mths)	1969 Post-N $\bar{X}$ CA (mths)	1969 Post-N $\bar{X}$ MA (mths)	CA Gain	MA Gain	MA diff. bet. Grps.	t
E_4	22	51	45	60	63	9	18	12	14.05***
C_4	20	49	45	58	51	9	6		5.97***

***$p < .001$

The E_4 group gained 18 Mental Age months compared to the C_4 groups's gain of 6 Mental Age months. Thus the first year of the Learning to Learn Program produced differential gains of 12 MA months with the second year of the Learning to Learn Program maintaining the 12 month MA difference between the groups.

Comparisons between the E_5 and C_5 Groups on the Stanford Binet

The means, standard deviations and t values between the experimental (E_5) and control (C_5) groups on the Stanford Binet taken at the end of first grade (1969-70) are presented in Table 13. The E_5 group's Binet IQ scores were significantly higher than their controls ($t = 4.18$, $p < .001$) at the end of first grade.

Table 13

A Post First Grade Comparison between the E_5 and C_5 Groups on the Stanford Binet

Measure	Grp.	N	$\bar{X}$ Age (mths)	YIEP	1970 $\bar{X}$ IQ Post-1st	S.D.	$\bar{X}$ IQ diff.	t
Stanford Binet	E_5	17	83	2	106.18	17.67	20.03	4.18***
	C_5	20	81	0	86.15	9.60		

***p < .001

A pre-post comparison between the E_5 and C_5 groups on the Stanford Binet taken at the beginning (1968) and at the end of the second year of the research project is presented in Table 14. The E_5 group's mean IQ gain over their two years in the Learning to Learn Program was approximately 16 1/2 IQ points while the control children lost approximately 3 1/2 IQ points over the same period of time. Thus, with the pre-program mean IQ's of the E_5 and C_5 groups being the same [E_5 (89.71); C_5 (89.62)] the mean IQ points difference between the two groups after two years is approximately 20 points, (E_5, t = 5.93, $p < .001$; C_5, t = 1.53, NS).

Table 14

A Pre-Post Comparison between the E_5 and C_5 Groups on the Stanford Binet taken at the beginning (1968) and at the end of Two Years (1970) in the Project

Measure	Grp.	N	$\bar{X}$ Age (mths)	YIEP	1968 $\bar{X}$ IQ Pre-K	N	$\bar{X}$ Age (mths)	YIEP	1970 $\bar{X}$ IQ Post-1st	$\bar{X}$ IQ Gain	$\bar{X}$ IQ diff.	t
Stanford Binet	E_5	17	62	0	89.71	17	83	2	106.18	16.47	20.04	5.93***
	C_5	20	62	0	89.62	20	81	0	86.15	(-3.57)		1.53 NS

***p < .001

Tables 15 and 16 represent pre-post yearly comparisons of the E_5 and C_5 groups in relation to Stanford Binet IQ gain. Table 15 represents the first grade school year (2nd year of the Learning to Learn Program) 1969-70, while Table 16 represents the kindergarten school year (first year of the Learning to Learn Program) 1968-69. During the second year of the Learning to Learn Program the E_5 group (Table 15) significantly increased their IQ in comparison to the previous year with a mean IQ point gain of 7.37 ($\underline{t}$ = 2.96, $p < .005$). The C_5 Group during the same period of time had a mean IQ decrease of 1.80 points from the previous year. This IQ decrease was statistically non-significant ($\underline{t}$ = 0.50). Thus there is a difference of 20 points between the two groups after two years of the Learning to Learn Program which is significant at the .001 level, ($\underline{t}$ = 4.18, $p < .001$).

Table 15

A Pre-Post Comparison between the E_5 and C_5 Groups on the Stanford Binet during the 1969-70 School Year

Measure	Grp.	N	Post-K $\bar{X}$ Age (mths)	YIEP	1969 $\bar{X}$ IQ Post-K	N	Post-1st $\bar{X}$ Age (mths)	YIEP	1970 $\bar{X}$ IQ Post-1st	$\bar{X}$ IQ diff. Grps.	$\bar{X}$ IQ Gain Loss	$\underline{t}$
Stanford Binet	E_5	21	71	1	98.81	17	83	2	106.18	20.03	7.37	2.96***
	C_5	21	70	0	87.95	20	81	0	86.15		(-1.80)	0.50NS

***$p < .005$

The E_5 group after the first year of the Learning to Learn Program (Table 16) exhibited a mean IQ gain of 10.86 points, ($\underline{t}$ = 6.20, $p < .001$) while the C_5 control group during that same period of time lost 2.67 mean IQ points, ($\underline{t}$ = .71, NS). These results indicate that the E_5 group exhibited relatively equal IQ gains over the first two years of the Learning to Learn Program, (first year IQ gain 9.10, second year IQ gain 7.37). Their control group showed a decrease in IQ over the same period of time (first year IQ decrease 2.67 points, second year decrease 1.80 points).

Table 16

A Pre-Post Comparison between the E_5 and C_5 Groups on the Stanford Binet during the 1968-69 School Year

Measure	Grp.	N	Pre-K $\bar{X}$ Age (mths)	YIEP	Pre-K $\bar{X}$ IQ	N	Post-K $\bar{X}$ Age (mths)	YIEP	1969 Post-K $\bar{X}$ IQ	$\bar{X}$ IQ diff.	$\bar{X}$ IQ Gain	t
Stanford Binet	E_5	21	62	0	89.71	21	71	1	98.81	10.86	9.10	6.20***
	C_5	21	62	0	89.62	21	70	0	87.95		(-2.67)	0.71 NS

***p < .001

Table 17 is a descriptive comparison between the E_5 and C_5 groups on the Stanford Binet over time for the duration of the Learning to Learn Program to date (1968-70). In making these descriptive comparisons it is of interest to point out the difference in the S.D. of the E_5 and C_5 group after first grade. The E_5, S.D. (17.67) closely approximates the S.D. of the Stanford Binet (15.00) while the C_5, S.D. (9.60) is markedly reduced.

Table 17

A Comparison between the E_5 and C_5 Groups on the Stanford Binet over time

Measure	Grp.	N	1968 Pre-K $\bar{X}$ IQ	S.D.	N	1969 Post-K $\bar{X}$ IQ	S.D.	N	1970 Post-1st $\bar{X}$ IQ	S.D.
Stanford Binet	E_5	21	89.71	9.54	21	98.81	10.93	17	106.18	17.67
	C_5	21	89.62	8.18	21	87.95	12.56	20	86.15	9.60

When comparing the upper, middle and lower thirds of the E_5 and C_5 groups (Table 18) (groupings were based on pre-test IQ), on the Stanford Binet it becomes apparent that all the E_5 groups gained IQ points over time. However, the upper one-third (mean IQ point gain 19.1, $t = 5.21$, $p < .001$), and the middle one-third (mean IQ point gain 19.3, $t = 3.66$,

p .001), gain about three times more IQ points than the lower one-third (mean IQ point gain 6.1, $\underline{t}$ = 1.83 NS). The trend of these findings did not hold true for the C_4 groups as the upper one-third lost 7.4 mean IQ points, ($\underline{t}$ = 1.87, NS), the middle one-third lost 3.0 mean IQ points ($\underline{t}$ = .58, NS), and the lower one-third group remained stable with a mean IQ gain of 0.2 points ($\underline{t}$ = .11, NS). When comparing the E_5 and C_5 upper, middle, and lower groups on IQ gain over time (1968-70) the difference between the upper and middle groups is similar (upper one-third 26.5 IQ points difference, middle one-third 22.3 IQ points difference) while the lower one-third group registers a smaller difference (lower one-third mean IQ point difference 5.9 points).

Table 18

A Comparison between the Upper, Middle and Lower E_5 and C_5 Groups based on Pre-Test IQ on the Stanford Binet over time (1968-70)

	Grp.	N	1968 Pre-K $\bar{X}$ IQ	N	1969 Post-K $\bar{X}$ IQ	N	1970 Post-1st $\bar{X}$ IQ	$\bar{X}$ IQ Gain or Loss	$\bar{X}$ IQ diff. bet Grps.	$\underline{t}$
Upper One-Third	E_5	7	100.1	7	109.5	7	119.2	19.1	26.5	5.21***
	C_5	7	98.6	7	98.3	7	91.2	(-7.4)		1.87 NS
Middle One-Third	E_5	7	90.3	7	99.1	5	109.6	19.3	22.3	3.66***
	C_5	7	90.5	7	81.7	6	87.5	(3.0)		.58 NS
Lower One-Third	E_5	7	78.7	7	87.7	5	84.8	6.1	5.9	1.83 NS
	C_5	7	79.8	7	83.9	7	80.0	0.2		.11 NS

***p (.005

Comparisons between the E_5 and C_5 groups on Stanford Binet Mental Age (MA) were undertaken in Tables 19, 20, 21,22.

The results of Table 19 indicate there was not any significant (t = .48 NS) difference in Mental Age (MA) between the E_5 (MA = 57) and C_5 (MA = 56) groups prior to the first year of the Learning to Learn Program.

Table 19

A Comparison between the E_5 and C_5 Groups on Stanford Binet Mental Age prior to the First Year (Kindergarten 1968) of the Learning to Learn Program

Grp.	N	YIEP	Grp. Status	$\bar{X}$ CA (mths)	$\bar{X}$ MA (mths)	S.D.	CA diff. bet. Grps	MA diff. bet Grps.	t
E_5	21	0	Pre-K 1968	62	57	4.96	0	1	.48 NS
C_5	21	0	Pre-K 1968	62	56	6.19			

After two years of the Learning to Learn Program (Table 20) the E_5 group gained 31 MA months, compared to a 23 month MA gain for the C_5 group. Thus after two years (1968-70) of the Learning to Learn Program there exists a nine month MA difference (eight month adjusted MA difference) between the E_5 and C_5 groups.

Table 20

A Pre-Post Comparison between the E_5 and C_5 Groups on Stanford Binet Mental Age after two years (Pre Kindergarten, 1968 - Post First Grade, 1970) of the Learning to Learn Program

	1968					1970							
Grp.	N	YIEP	Pre-K $\bar{X}$ CA	Pre-K $\bar{X}$ MA	N	YIEP	Post-1st $\bar{X}$ CA	Post-1st $\bar{X}$ MA	CA Gain	MA Gain	MA diff. bet. Grp.	Adj. MA diff. Grp.	t
E_5	21	0	62	57	17	2	83	88	21	31	9	8	13.51***
C_5	21	0	62	56	20	0	81	79	19	23			10.34***

***p < .001

During the second year of the Learning to Learn Program (Table 21) (1969-70) the E_5 and C_5 groups gained the same number of Mental Age months (17). There was however a difference of 9 MA months (8 adjusted MA months) between the two groups.

Table 21

A Pre-Post Comparison between the E_5 and C_5 Groups on Stanford Binet Mental Age during the Second Year (Post Kindergarten 1969 - Post First Grade 1970) of the Project

Grp.	N	YIEP	1969 Post-K $\bar{X}$ CA	$\bar{X}$ MA	N	YIEP	1970 Post-1st $\bar{X}$ CA	$\bar{X}$ MA	CA Gain	MA Gain	MA diff. bet. Grp.	Adj. MA diff. Grp.	t
E_5	21	1	71	71	17	2	83	88	12	17	9	8	9.18***
C_5	21	0	70	62	20	0	81	79	11	17			4.29***

***p < .001

During the first year (1968-69) of the Learning to Learn Program (Table 22) the E_5 and C_5 groups had large differential gains in mental growth. The E_5 group gained 14 Mental Age months compared to the C_5 group gain of 6 Mental Age months.

Table 22

A Pre-Post Comparison between the E_5 and C_5 Groups on Stanford Binet Mental Age after One Year (Kindergarten 1969) of the Project

Grp.	N	YIEP	1968 Pre-K $\bar{X}$ CA	$\bar{X}$ MA	MA diff. bet. Grps.	1969 Post-K $\bar{X}$ CA	$\bar{X}$ MA	CA Gain	MA Gain	MA diff. bet. Grps.	Adj. MA diff. Grp.	t
E_5	21	1	62	57	1	71	71	9	14	8	7	13.29***
C_5	21	0	62	56		70	62	8	6			3.76**

***p < .001 **p < .01

Thus the first year of the Learning to Learn Program produced a differential gain of 8 months MA (7 months adjusted MA) with the second year of the Learning to Learn Program maintaining the 8 months MA difference (7 months adjusted MA difference) between the groups.

Comparisons between the E_4 and E_5 Groups on the Stanford Binet at ages Five and Six.

When comparing the E_4 and E_5 groups at age 6 (post kindergarten) on the Stanford Binet, (Table 23), the E_4 group scored (mean IQ 108.55) significantly higher on the Stanford Binet ($t = 2.60$, $p < .01$) than the E_5 group (mean IQ 98.81). There exists after the kindergarten school year a mean IQ difference of 9.74 points between the two experimental groups.

Table 23

A Comparison between the E_4 and E_5 Groups at Age 6 (Post Kindergarten) on the Stanford Binet

Measure	Grp.	N	YIEP	Post-K $\bar{X}$ Age	Post-K $\bar{X}$ IQ	S.D.	IQ diff. bet Grps.	t
Stanford Binet	E_4	22	2	70	108.55	13.29	9.74	2.60**
	E_5	21	1	71	98.81	11.19		

**$p < .01$

Table 24 presents a comparison between the E_4 and E_5 groups at age 5. This analysis was performed in order to examine the effects of one year of the Learning to Learn Program on the E_4 group when compared to the E_5 group who had not yet participated in the program. Results of this comparison indicate that the E_4 group's mean IQ (107.36) was 17.65 points higher than the E_5 group (89.71), which was significant at the .001 level ($t = 5.70$).

Table 24

A Comparison between the E_4 (Post Nursery) and E_5 (Pre Kindergarten) Groups at Age 5 on the Stanford Binet

Measure	Grp.	N	YIEP	$\bar{X}$ Age	Status	$\bar{X}$ IQ	S.D.	$\bar{X}$ IQ diff. bet. Grps.	t
Stanford Binet	E_4	23	1	60	Post-Nursery	107.36	9.93	17.65	5.70***
	E_5	21	0	62	Pre-Kindergarten	89.71	9.54		

***p <.001

Tables 25 and 26 represent comparisons between the C_4 and C_5 control groups at ages 5 and 6 on the Stanford Binet. This anslysis was undertaken to examine whether differences in intellectual performance existed between the control groups. The C_4 group at age 6 (Table 25) exhibits a greater mean IQ (93.45) than the C_5 group (87.95). At age 6 there is a 5.50 IQ point difference between the two control groups, however, this IQ difference is non significant.

Table 25

A Comparison between C_4 and C_5 Groups at Age 6 (Post Kindergarten) on the Stanford Binet

Measure	Grp.	N	Post-K $\bar{X}$ Age	Post-K $\bar{X}$ IQ	S.D.	$\bar{X}$ IQ diff. bet. Grps.	t
Stanford Binet	C_4	21	69	93.45	9.08	5.50	1.72 NS
	C_5	21	70	87.95	12.56		

When comparing the C_4 and C_5 groups at approximately age 5 (Table 26) there is relatively little difference in the intellectual performance of the C_4 (mean IQ 88.14) or C_5 (mean IQ 89.62) groups (mean IQ difference

between the two groups is .48 points), ($\underline{t}$ = .68 NS).

Table 26

A Comparison between the C_4 and C_5 Groups at Age 5 (Pre Kindergarten) on the Stanford Binet

Measure	Grp.	N	Pre-K $\bar{X}$ Age	Pre-K $\bar{X}$ IQ	S.D.	$\bar{X}$ IQ diff. bet. Grps.	$\underline{t}$
Stanford Binet	C_4	21	58	88.14	6.96	.48	.68 NS
	C_5	21	62	89.62	8.18		

Tables 27, 28, 29, 30 represent comparisons between the E_4, E_5, C_4 and C_5 groups on Stanford Binet Mental Age.

A pre-post comparison between the E_4 and E_5 groups on Binet Mental Age is presented in Table 27. Both experimental groups (E_4 and E_5) exhibit relatively similar mental age gains from age 5 to age 6. (E_4, 13 month Mental Age gain; E_5, 14 month Mental Age gain). However there exists a 5 month Mental Age difference between the two groups (E_4, 76 month Mental Age; E_5, 71 months Mental Age) at age 6.

Table 27

A Pre-Post Comparison between the E_4 and E_5 Groups at Age 6 on the Stanford Binet MA

Grp.	N	YIEP	Status	1968 $\bar{X}$ CA (mths)	1968 $\bar{X}$ MA (mths)	N	Status	YIEP	1969 $\bar{X}$ CA	1969 $\bar{X}$ MA	CA diff.	MA diff.	CA Gain	MA Gain	$\underline{t}$
E_4	23	1	Post-N	60	63	22	Post-K	2	71	76	0	5	11	13	8.17***
E_5	21	0	Pre-K	62	57	17	Post-K	1	71	71			9	14	13.29***

***p < .001

Table 28 compares the E_4 and E_5 groups on Stanford Binet Mental Age at age 5. The results indicate that the E_4 group after one year in the Learning to Learn Program has a six month MA advantage over the E_5 group which is significant at the .01 level ($t = 3.23$). This MA difference between the E_4 and E_5 groups also holds up at age 6 (Table 27; MA differences between the E_4 and E_5 groups is 5 MA months).

Table 28

A Comparison between the E_4 (Post Nursery) and E_5 (Pre Kindergarten) Groups at Age 5 on the Stanford Binet MA

Grp.	N	YIEP	Status	$\bar{X}$ CA (mths)	$\bar{X}$ MA (mths)	$\bar{X}$ CA diff. bet Grps.	$\bar{X}$ MA diff. bet. Grps.	t
E_4	23	1	Post-N	60	63	2	6	3.23**
E_5	21	0	Pre-K	62	57			

**p <.01

When comparing the C_4 and C_5 groups on Binet MA at age 6 (Table 29) there exists a 2 month MA difference between the control groups. When making a similar comparison at age 5 (Table 30) there existed a MA difference of 5 months between the C_4 and C_5 groups. The two control groups are becoming more similar over time in relation to mental age (5 month MA difference at age 5; 2 month MA difference at age 6).

Table 29

A Pre-Post Comparison between the C_4 and C_5 Groups at Age 6 on the Stanford Binet MA

Grp.	N	Status	1968 $\bar{X}$ CA	1968 $\bar{X}$ MA	1969 $\bar{X}$ CA Post-K	1969 $\bar{X}$ MA Post-K	CA Gain	MA Gain	MA diff. bet. Grps.	t
C_4	21	Post-N	58	51	69	64	11	13	2	1.15 NS
C_5	21	Pre-K	62	56	.70	62	8	6		

Table 30

A Comparison between the C_4 and C_5 Groups at Age 5

on the Stanford Binet MA

Grp.	N	Status	$\overline{X}$ CA (mths)	$\overline{X}$ MA (mths)	CA Diff.	MA Diff.	t
C_4	21	Post-N	58	51	4	5	2.91*
C_5	21	Pre-K	62	56			

*p < .05

A post kindergarten comparison between the E_4 and C_4 groups on four subtests of the ITPA (Visual Decoding, Visual Motor Association, Vocal Encoding, Auditory-Vocal Association) is presented in Table 31. The results of the analysis indicate that the E_4 group after two years in the program scored higher (ranging from 2 Language Age months on the Visual Decoding subtest to 11 Language Age months on the Auditory-Vocal Association subtest) than their C_4 controls. The E_4 group scored significantly better than the C_4 group on the Visual Motor Association subtest ($t = 2.00$, $p < .05$) and the Auditory-Vocal Association subtest ($t = 2.73$, $p < .05$).

Table 31

A Post Kindergarten Comparison between the E_4 and C_4 Groups

on Four Subtests of the ITPA

Measure	Grp.	N	YIEP $\overline{X}$ Age	$\overline{X}$ Lang. Age.	S.D.	$\overline{X}$ Lang. Age Diff. bet. Grps.	$\overline{X}$ LA-CA	$\overline{X}$ LA-CA diff. bet. Grps.	t
ITPA									
Visual Decoding	E_4	22	2 71	70	9.59	2	-1	0	.33 NS
	C_4	20	0 69	68	17.87		-1		
Visual Motor Assoc.	E_4	22	2 71	80	11.52	9	+8	6	2.00*
	C_4	20	0 69	71	17.28		+2		

Con't

Table 31 con't

Measure	Grp.	N	YIEP $\bar{X}$ Age	$\bar{X}$ Lang. Age	S.D.	$\bar{X}$ Lang. Age Diff. bet. Grps.	$\bar{X}$ LA < CA	$\bar{X}$ LA < CA Diff. Bet. Grps.	t
ITPA									
Vocal Encoding	E_4	22	2 71	68	18.59	7	-3	6	1.32 NS
	C_4	20	0 69	61	16.25		-9		
Auditory-Vocal Assoc.	E_4	22	2 71	71	13.27	11	0	9	2.73**
	C_4	20	0 69	60	13.68		-9		

*p < .05

**p < .01

Table 32 represents the post nursery school comparison between the E_4 and C_4 groups on the four subtests on the ITPA (VE, VMA, VE, AVA). The E_4 group out performed the C_4 group on all subtests of the ITPA (ranging from 11 Language months on the AVA subtest to 19 Language Age months on the Visual Motor Association subtest), which was of practical as well as statistical significance (t's ranging from 2.80, $p < .01$ on Visual Decoding to a t of 4.38 Vocal Encoding $p < .001$).

Table 32

A Post Nursery Comparison between the E_4 and C_4 Groups on Four Subtests of the ITPA

Measure	Grp.	N	YIEP	$\bar{X}$ Age	$\bar{X}$ Lang. Age	S.D.	$\bar{X}$ Lang. Age Diff. bet. Grps.	$\bar{X}$ LA < CA	$\bar{X}$ LA < CA diff. bet. Grps.	t
ITPA										
Visual Decoding	E_4	22	1	60	53	15.21	13	- 7	11	2.80**
	C_4	20	0	58	40	14.99		-18		
Visual Motor Assoc.	E_4	22	1	60	65	15.02	19	+15	27	3.55***
	C_4	20	0	58	46	19.28		-12		
Vocal Encoding	E_4	22	1	60	62	10.83	17	+ 2	15	4.38***
	C_4	20	0	58	45	13.57		-13		
Auditory Vocal Assoc.	E_4	22	1	60	52	12.78	11	- 8	11	3.19**
	C_4	20	0	58	41	9.29		-17		

**p < .01

***p < .001

A post first grade comparison between the E_5 and C_5 groups on four subtests of the ITPA is presented in Table 33. On all four subtests the E_5 group out performed their C_5 controls (ranging from a 7 month Language Age difference on the Visual Decoding subtest to an 18 month Language Age difference on the Auditory Vocal Association subtests). Two of the four subtests, (Vocal Encoding and Auditory Vocal Association) were significant in favor of the E_5 group. (VE $t = 2.10$, $p < .05$; AVA $t = 3.76$, $p < .001$).

Table 33

A Post 1st Grade Comparison between the E_5 and C_5 Groups on Four Subtests of the ITPA

Measure	Grp.	N	YIEP	$\bar{X}$ Age	$\bar{X}$ Lang. Age	S.D.	$\bar{X}$ Lang Age Diff. bet. Grps.	$\bar{X}$ LA CA	$\bar{X}$ LA CA diff. bet. Grps.	t
ITPA										
Visual Decoding	E_5	17	2	83	77	12.86	7	- 6	5	1.56 NS
	C_5	20	0	81	70	14.81		-11		
Visual Motor Assoc.	E_5	17	2	83	82	11.40	8	- 1	6	1.43 NS
	C_5	20	0	81	74	19.26		- 7		
Vocal Encoding	E_5	17	2	83	79	13.66	11	- 4	9	2.10*
	C_5	20	0	81	68	18.28		-13		
Auditory Vocal Assoc.	E_5	17	2	83	86	14.59	18	3	16	3.76***
	C_5	20	0	81	68	15.39		-13		

*p < .05

***p < .001

Table 34 represents the post kindergarten comparison between the E_5 and C_5 groups on the same four subtests of the ITPA. On two of the four subtests (Visual Motor Association and Auditory Vocal Association), the E_5 group out performed their C_5 controls (a 9 month Language Age difference on VMA and a 10 month Language Age difference on the AVA subtest). This difference between the E_5 and C_5 groups was significant at the .05 level (t = 2.40, VMA, t = 2.20 AVA).

Table 34

A Post Kindergarten Comparison between the E_5 and C_5 Groups on Four Subtests of the ITPA

Measure	Grp.	N	YIEP $\bar{X}$ Age	$\bar{X}$ Lang. Age	S.D.	$\bar{X}$ Lang. Age Diff. bet. Grps.	$\bar{X}$ LA<CA	$\bar{X}$ LA<CA diff. bet. Grps.	t
ITPA									
Visual Decoding	E_5	21	1 71	66	12.86	1	-5	0	.14 NS
	C_5	21	0 70	65	14.49		-5		
Visual Motor Assoc.	E_5	21	1 71	76	13.76	9	5	8	2.40*
	C_5	21	0 70	67	11.83		-3		
Vocal Encoding	E_5	21	1 71	62	13.10	(2)	-9	(3)	.39 NS
	C_5	21	0 70	64	11.10		-6		
Auditory Vocal Assoc.	E_5	21	1 71	72	11.44	10	1	9	2.20*
	C_5	21	0 70	62	14.57		-8		

*p<.05

A pre-program comparison between two subtests of the ITPA (Auditory Vocal Association and Vocal Encoding) is presented in Table 35. No significant differences were found between the E_5 and C_5 groups (t = .13 AVA subtest; t = .24 VE subtest).

Table 35

A Pre Kindergarten Comparison between the E_5 and C_5 Groups on Two Subtests of the ITPA

Measure	Grp.	N	YIEP $\bar{X}$ Age	$\bar{X}$ Lang. Age	S.D.	$\bar{X}$ Lang. Age Diff. bet. Grps.	$\bar{X}$ LA>CA	$\bar{X}$ LA>CA diff. bet. Grps.	t
ITPA									
Auditory Vocal Assoc.	E_5	17	0 62	46	7.45	0	-16	0	.13 NS
	C_5	18	0 62	46	12.97		-16		
Vocal Encoding	E_5	17	0 62	52	10.71	(1)	-10	(1)	.24 NS
	C_5	18	0 62	53	14.79		- 9		

A post kindergarten comparison between the E_4 and E_5 groups on the four subtests of the ITPA is presented in Table 36. The E_4 group scored higher than the E_5 group on three of the four subtests of the ITPA (ranging from 3 Language Age months on the VMA subtest to 6 Language Age months on the Vocal Encoding subtest). These differences are not of statistical significance.

Table 36

A Post Kindergarten Comparison between the E_4 and E_5 Groups on the Four Subtests of the ITPA

Measure	Grp.	N	YIEP	$\bar{X}$ Age	$\bar{X}$ Lang. Age	S.D.	$\bar{X}$ Lang Age Diff. bet. Grps.	$\bar{X}$ LA/CA	$\bar{X}$ LA/CA Diff. bet. Grps.	t
ITPA Visual Decoding	E_4	22	2	71	70	9.59	4	-1	4	1.05 NS
	E_5	21	1	71	66	12.86		-5		
Visual Motor Assoc.	E_4	22	2	71	79	11.52	3	+8	3	1.01 NS
	E_5	21	1	71	76	13.76		+5		
Vocal Encoding	E_4	22	2	71	68	18.59	6	-3	6	1.04 NS
	E_5	21	1	71	62	13.10		-9		
Auditory Vocal Assoc.	E_4	22	2	71	71	13.27	(1)	0	(1)	.04 NS
	E_5	21	1	71	72	11.44		+1		

The same post kindergarten comparison between the C_4 and C_5 groups is presented in Table 37. The results of this analysis reveal no statistical differences between the C_4 and C_5 groups on the four subtests of the ITPA.

Table 37

A Post Kindergarten Comparison between the C_4 and C_5 Groups on the Four Subtests of the ITPA

Measure	Grp.	N	YIEP	$\bar{X}$ Age	$\bar{X}$ Lang. Age	S.D.	$\bar{X}$ Lang. Age Diff. bet. Grps.	$\bar{X}$ LA < CA	$\bar{X}$ LA < CA Diff. bet. Grps.	t
Visual Decoding	C_4	20	0	69	68	17.87	3	-1	4	.61 NS
	C_5	21	0	70	65	14.49		-5		
Visual Motor Assoc.	C_4	20	0	69	71	17.28	4	+2	5	.91 NS
	C_5	21	0	70	67	11.83		-3		
Vocal Encoding	C_4	20	0	69	61	16.25	(3)	-8	(2)	.67 NS
	C_5	21	0	70	64	11.10		-6		
Auditory Vocal Assoc.	C_4	20	0	69	60	13.68	(2)	-9	(1)	.58 NS
	C_5	21	0	70	62	14.57		-8		

Tables 38 and 39 represent a comparison between the E_4 and C_4 groups on the Bender Gestalt test. (Table 38 is a post kindergarten comparison, Table 39 is a post nursery comparison).

The results of Table 38 indicate that the E_4 group's performance on the Bender Gestalt is of statistical significance when compared to that of the C_4 group after kindergarten ($t = 6.32$, $p < .001$). Similar findings are reported after nursery school in Table 39. The performance of the E_4 group on the Bender Gestalt is significant at the .01 level ($t = 3.28$) when compared to the C_4 group.

Table 38

A Post Kindergarten Comparison between the E_4 and C_4 Groups on the Bender Gestalt during the 1969-70 School Year

Measure	Grp.	N	$\bar{X}$ Age	YIEP	$\bar{X}$ Error Score Post-K	$\bar{X}$ Error Score diff. bet. Grps.	S.D.	t
Bender Gestalt	E_4	22	70	2	10.00	5.25	2.61	6.32***
	C_4	20	69	0	15.25		2.75	

***$p < .001$

Table 39

A Post Nursery School (1969) Comparison between the E_4 and C_4 Groups on the Bender Gestalt

Measure	Grp.	N	$\bar{X}$ Age	YIEP	$\bar{X}$ Error Score Post-N	$\bar{X}$ Error Score diff. bet. Grps.	S.D.	t
Bender Gestalt	E_4	23	60	1	16.48	4.57	3.69	3.28**
	C_4	21	60	0	21.05		5.26	

**$p < .01$

Tables 40 and 41 represent post first grade and post kindergarten comparisons between the E_5 and C_5 groups on the Bender Gestalt. In both analyses the E_5 group's performance on the Bender is statistically superior to that of the C_5 group, (post first grade $t = 2.12$, $p < .05$; post kindergarten $t = 3.54$, $p < .01$).

Table 40

A Post First Grade Comparison between the E_5 and C_5 Groups on the Bender Gestalt during the 1969-70 School Year

Measure	Grp.	N	$\bar{X}$ Age	YIEP	$\bar{X}$ Error Score Post-1st	S.D.	$\bar{X}$ Error Score diff. bet. Grps.	t
Bender Gestalt	E_5	17	83	2	6.59	2.65	2.46	2.12*
	C_5	20	80	0	9.05	4.32		

*p < .05

Table 41

A Post Kindergarten (1969) Comparison between the E_5 and C_5 Groups on the Bender Gestalt

Measure	Grp.	N	$\bar{X}$ Age	YIEP	$\bar{X}$ Error Score Post-K	S.D.	$\bar{X}$ Error Score diff. bet. Grps.	t
Bender Gestalt	E_5	21	71	1	12.00	2.82	4.48	3.54**
	C_5	21	70	0	16.48	4.90		

**p < .01

Tables 42 and 43 represent post kindergarten comparisons between the E_4 and E_5 groups and the C_4 and C_5 groups on the Bender Gestalt. The performance of the E_4 group on the Bender Gestalt is of statistical significance when compared to that of the E_5 group, ($t = 2.37$, $p < .05$). The comparison between the C_4 and C_5 groups on the Bender Gestalt (Table 43) indicates little difference between the two groups ($\bar{X}$ error difference between groups = 1.23, $t = .98$ NS).

Table 42

A Post Kindergarten Comparison between the E_4 and E_5 Groups on the Bender Gestalt

Measure	Grp.	N	$\bar{X}$ Age	YIEP	Year Tested	$\bar{X}$ Error Score Post-K	S.D.	$\bar{X}$ Error Score diff. bet. Grps.	t
Bender Gestalt	E_4	22	70	2	1970	10.00	2.61	2.00	2.37*
	E_5	21	71	1	1969	12.00	2.90		

*p .05

Table 43

A Post Kindergarten Comparison between the C_4 and C_5 Groups on the Bender Gestalt

Measure	Grp.	N	$\bar{X}$ Age	YIEP	Year Tested	$\bar{X}$ Error Score Post-K	S.D.	$\bar{X}$ Error Score diff. bet. Grps.	t
Bender Gestalt	C_4	20	71	0	1970	15.25	2.75	1.23	.98 NS
	C_5	21	70	0	1969	16.48	4.90		

A post kindergarten comparison between the E_4 and C_4 groups and between the E_5 and C_5 groups on the School Readiness Screening Test (SRST) is presented in Table 44. The E_4 group's $\bar{X}$ score of 21.45 is statistically significant ($t = 4.09$, $p < .001$) over the C_4 group's $\bar{X}$ score of 16.10 on the SRST. The comparison between the E_5 and C_5 groups reveals similar findings with the E_5 group's $\bar{X}$ score of 19.19 being significantly greater ($t = 2.22$, $p < .05$) than the C_5 group's score of 16.05.

Table 44

A Post Kindergarten Comparison between the E_4 and C_4 Groups on the School Readiness Screening Test during the 1969-70 School Year and between the E_5 and C_5 Groups during the 1968-69 School Year

Measure	Grp.	N	$\bar{X}$ Age	YIEP	Mean	S.D.	$\bar{X}$ Diff.	t
SRST	E_4	22	70	2	21.45	4.14	5.35	4.09***
	C_4	20	69	0	16.10	4.33		
SRST	E_5	21	71	1	19.19	4.70	3.14	2.22*
	C_5	21	70	0	16.05	4.26		

*p < .05 ***p < .001

Tables 45 and 46 represent post kindergarten comparisons between the E_4 and E_5 groups and the C_4 and C_5 groups at approximately age 6. The E_4 group scores a mean of 2.26 points higher on the SRST than the E_5 group which is significant at the .05 level, (t = 1.74). When comparing the control groups (C_4 and C_5) on the SRST (Table 46) their scores are very similar, thus revealing no practical differences between these groups at age 6, (t = .04 NS)

Table 45

A Post Kindergarten Comparison between the E_4 and E_5 Groups on the School Readiness Screening Test

Measure	Grp.	N	$\bar{X}$ Age	YIEP	$\bar{X}$ Raw Score	S.D.	$\bar{X}$ Diff. bet. Grps.	t
SRST	E_4	22	70	2	21.45	4.14	2.26	1.74*
	E_5	21	69	1	19.19	4.33		

*p < .05

Table 46

A Post Kindergarten Comparison between the C_4 and C_5 Groups on the School Readiness Screening Test

Measure	Grp.	N	$\bar{X}$ Age	YIEP	$\bar{X}$ Raw Score	S.D.	$\bar{X}$ Diff. bet. Grps.	t
SRST	C_4	20	71	0	16.10	4.33	.05	.04 NS
	C_5	21	70	0	16.05	4.26		

A post first grade comparison between the E_5 and C_5 groups on the Primary Mental Abilities test is presented in Table 47. The results indicate that the scores of the E_5 group on all the subtests of the PMA are of statistical significance as well as of practical significance (mean MA difference between the E_5 and C_5 groups on the subtests of the PMA range from 6 MA months to 10 MA months) when compared to the C_5 group's scores. When comparing the "Total Score" between the two groups ($t = 3.43$, $p < .001$) it is important to point out that the E_5 group's MA is 3 months below their CA while the C_5 group's MA is 9 months below their CA. The E_5 group's highest MA performance is in the area of perceptual speed (MA = 86 months) which is 10 MA months higher than the C_5 group's highest MA (MA = 76 months).

Table 47

A Post First Grade Comparison between Groups E_5 and C_5 on the Primary Mental Abilities Test During the 1969-70 School Year

Measure	Grp.	N	$\overline{X}$ CA	$\overline{X}$ MA	$\overline{X}$ MA diff.	$\overline{X}$ Score	S.D.	$\overline{X}$ Score diff.	t
PMA									
Verbal Meaning	E_5	17	83	74	6	34.06	6.29	4.96	2.25*
	C_5	20	81	68		29.10	7.13		
Perceptual Speed	E_5	17	83	88	10	22.29	3.24	4.89	3.76***
	C_5	20	81	78		17.40	4.64		
Number Facility	E_5	17	83	82	8	19.65	3.48	4.70	3.07***
	C_5	20	81	74		14.95	5.72		
Spatial Relations	E_5	17	83	76	6	17.00	3.57	3.00	2.09*
	C_5	20	81	70		14.00	5.13		
Total	E_5	17	83	80	8	93.00	11.58	17.55	3.43***
	C_5	20	81	72		75.45	19.11		

*$p < .05$

***$p < .001$

A pre first grade comparison between the E_5 and C_5 groups on the Metropolitan Readiness test is displayed in Table 48. The E_5 group performed significantly better on all subtests of the Metropolitan Readiness Test than their controls. On the word meaning subtest the difference was significant at the .05 level whereas the other subtests were significant beyond the .001 level. When comparing the E_5 and C_5 groups on Metropolitan total raw score the E_5 group out performs the C_5 by 27.30 raw score points, which is significant at the .001 level, ($t = 7.01$).

Table 48

A Pre First Grade Comparison between Groups E_5 and C_5 on the Metropolitan Readiness Test during the 1969-70 School Year

Measure	Grp.	N	$\bar{X}$ Raw Score	S.D.	$\bar{X}$ Raw Score diff.	t
MRT						
Word Meaning	E_5	17	6.76	1.89	1.31	2.07*
	C_5	20	5.45	1.96		
Listening	E_5	17	11.47	1.62	4.02	5.46***
	C_5	20	7.45	2.78		
Matching	E_5	17	8.71	2.17	2.91	3.02***
	C_5	20	5.80	3.59		
Alphabet	E_5	17	15.59	1.00	9.29	9.72***
	C_5	20	6.30	4.13		
Numbers	E_5	17	14.71	4.12	6.71	5.59***
	C_5	20	8.00	2.97		
Copying	E_5	17	7.35	2.15	3.45	3.23***
	C_5	20	3.90	4.17		
Total	E_5	17	64.00	8.75	27.30	7.01***
	C_5	20	36.70	14.61		

*$p < .05$

*** $p < .001$

Table 49 presents the results of a post first grade comparison between the E_5 and C_5 groups on the Stanford Achievement test. The E_5 group significantly out performed the control group on all subtests of the Stanford Achievement test ($t = 1.74$, $p < .05$ for Word Meaning subtest, all the other subtests have t's ranging from 3.21 to 8.05 which are significant beyond $p < .001$). The E_5 group's highest performance was on

the Arithmetic subtest where their number right mean score doubled the C_5 group's performance. The difference between the E_5 and C_5 group's performance on that subtest was 25.95 points.

Table 49

A Post First Grade Comparison between the E_5 and C_5 Groups on the Standard Achievement Test during the 1969-70 School Year

Measure	Grp.	$\bar{X}$ CA	$\bar{X}$ Raw Score	S.D.	$\bar{X}$ Raw Score diff.	t
SAT Word Reading	E_5	83	16.71	5.54	6.76	3.49***
	C_5	81	9.95	6.24		
Paragraph Reading	E_5	83	15.71	6.16	7.41	3.21***
	C_5	81	8.30	7.83		
Vocabulary	E_5	83	17.71	6.54	3.66	1.74*
	C_5	81	14.05	6.16		
Spelling	E_5	83	14.18	4.10	11.63	8.05***
	C_5	81	2.55	4.68		
Word Study Skills	E_5	83	33.00	6.70	11.85	3.98***
	C_5	81	21.15	11.16		
Arithmetic	E_5	83	46.35	8.83	25.95	6.70***
	C_5	81	20.40	14.44		

*p<.05
***p<.001

Comparison between the experimental and control groups based on analysis of stories.

Each child was individually given the W-5, I Wonder Card, from the Peabody Language Development Kit, Level II and asked to tell the best story he could about the picture. The stories were analyzed in terms of total

number of words, number of sentences, and mean length of remarks. Results of these comparisons are shown in Table 50 for groups E_4 and C_4 and in Table 51 for groups E_5 and C_5. This data is descriptive and is presented to give a more qualitative presentation of how the quality of the stories differed for various experimental and control groups. As can be seen from Tables 50 and 51 both the E_4 and E_5 group showed superior usage of language in that they told longer stories, (number of words), used a greater number of longer sentences (mean length of remark), than the C_4 and C_5 control groups. (t tests were not performed since the data was not normally distributed). In addition stories were rated for creativity, abstraction, and language quality on the basis of a six point scale by two raters. A copy of the rating scale used is in the Appendix. Results of these ratings are shown in Table 52 for groups E_4 and C_4 and in Table 53 for groups E_5 and C_5.

Table 50

A Post Kindergarten Comparison between Groups E_4 and C_4 on Stories during the 1969-70 School Year

Measure	Grp.	N	$\bar{X}$ Age	$\bar{X}$ Score	S.D.	$\bar{X}$ Score diff.	Median Score	Median Score diff.
Original Stories No. of Words	E_4	22	62	115.05	106.29	36.10	80.00	26.00
	C_4	20	61	78.95	76.22		54.00	
No. of Sentences	E_4	22	62	8.27	5.92	1.12	6.50	2.86
	C_4	20	61	7.15	6.35		3.64	
Mean Length of Remark	E_4	22	62	8.21	2.02	1.67	6.79	1.91
	C_4	20	61	6.45	1.64		4.88	

Table 51

A Post First Grade Comparison between Groups E_5 and C_5 on Stories during the 1969-70 School Year

Measure	Grp.	N	$\overline{X}$ Age	$\overline{X}$ Score	S.D.	$\overline{X}$ Score diff.	Median Score	Median Score diff.
Original Stories								
No. of Words	E_5	17	71	92.00	61.87	31.65	70.00	21.00
	C_5	20	70	60.35	36.52		49.00	
No. of Sentences	E_5	17	71	6.17	3.98	1.87	5.00	1.90
	C_5	20	70	4.30	2.56		3.10	
Mean Length of Remark	E_5	17	71	10.27	4.12	2.87	7.71	2.35
	C_5	20	70	7.40	4.00		5.36	

Table 52 represents a post kindergarten comparison between the E_4 and C_4 groups on creativity, abstraction and language quality. The E_4 group performed better than their C_4 controls on all three of these measures, (mean rating score difference between the E_4 and C_4 groups ranged from .22 points on language quality to .50 points on abstraction level), however, the E_4 and C_4 groups were not statistically different on these measures.

Table 52

A Post Kindergarten Comparison between E_4 and C_4 Groups on Creativity, Abstraction, and Language Quality during the 1969-70 School Year

Measure	Grp.	N	$\overline{X}$ Age	$\overline{X}$ Rating Score	S.D.	$\overline{X}$ Rating Score diff.	t
Original Stories							
Creativity	E_4	22	62	3.55	1.24	.45	1.31 NS
	C_4	20	61	3.10	.85		
Abstraction	E_4	22	62	3.93	1.09	.50	1.44 NS
	C_4	20	61	3.43	1.14		
Language Ability	E_4	22	62	3.45	1.08	.22	.76 NS
	C_4	20	61	3.23	.80		

Table 53 represents the comparison between the E_5 and C_5 groups on the same three variables. The E_5 group performed better than their C_5 controls on all three of these measures, (mean rating score differences between the E_5 and C_5 groups range from .46 points on language quality to .66 points on creativity), with the rating for creativity significant at .05 level ($\underline{t}$ = 1.77).

Table 53

A Post First Grade Comparison between E_5 and C_5 Groups on Creativity, Abstraction and Language Quality during the 1969-70 School Year

Measure	Grp.	N	$\overline{X}$ Age	$\overline{X}$ Rating Score	S.D.	$\overline{X}$ Rating Score diff.	$\underline{t}$
Original Stories							
Creativity	E_5	17	71	3.94	1.24	.66	1.77*
	C_5	20	70	3.28	1.16		
Abstraction	E_5	17	71	4.41	1.11	.53	1.55 NS
	C_5	20	70	3.88	1.09		
Language Quality	E_5	17	71	3.74	.92	.46	1.66 NS
	C_5	20	70	3.28	.83		

*p < .05

Comparison between the experimental and control groups based on analysis of mathematics performance measure.

A mathematics performance measure was individually administered to the E_5 and C_5 groups during the spring of 1970 near the completion of their first grade year. Each child was given a pencil and a paper with 4 groups of numbers on it and instructed to make up as many problems as he could. A copy of the measure, the instructions, and the scoring criteria are included in the appendix. Results of the children's performance are shown in Table 54.

This data is descriptive and is presented in order to furnish as much information as possible regarding the E_5 and C_5 groups' mathematical ability

The E_5 group on 11 of the 12 mathematics measures performed better than their C_5 control group. It is of interest to point out that the E_5 children on this test did not exhibit any handwriting reversals. This was not the case for the C_5 control group where 50% of the children exhibited reversals in their writings.

Table 54

A Post First Grade Comparison between Groups E_5 and C_5 on a Mathematics Performance Measure During the 1969-70 School Year

Measure	Grp.	No. of Children	Number of Problems Attempted	Number of Classifiable Problems	Number Accurate	Percent Accurate
Mathematics Performance						
Total No. of Problems	E_5	17 of 17	317	317	290	91.5%
	C_5	20 of 20	211	158	78	49.4%
No. of Addition Problems with 2 Elements	E_5	17 of 17		188		
	C_5	11 of 20		123		
No. of Addition Problems with 3 Elements	E_5	12 of 17		35		
	C_5	0 of 20		0		
No. of Addition Problems with 4 Elements	E_5	5 of 17		12		
	C_5	0 of 20		0		
No. of Addition Problems with 5 or more Elements	E_5	2 of 17		4		
	C_5	0 of 20		0		
No. of Subtraction Problems	E_5	15 of 17		75		
	C_5	4 of 20		35		
No. of Problems of other Types	E_5	1 of 17		3		
	C_5	0 of 20		0		

(Table con't)

Table 54 con't

Measure	Grp.	No. of Children	Number of Problems Attempted	Number of Classifiable Problems	Number Accurate	Percent Accurate
Mathematics Performance						
Ability to make a correct Mathematical Statement	E_5	17 of 17		297	290	97.7%
	C_5	9 of 20		103	78	75.7%
Utilize Pattern in second group of numbers	E_5	14 of 17				
	C_5	3 of 20				
Utilize Pattern in fourth group of numbers	E_5	0 of 17				
	C_5	0 of 20				
Utilize a given number as an answer	E_5	16 of 17				
	C_5	3 of 20				
Handwriting Reversals	E_5	0 of 17				
	C_5	10 of 20				

Comparisons between the E_4 and C_4; E_5 and C_5; and E_4 and E_5 groups on Teacher Ratings are presented in Tables 55, 56, 57.

The post kindergarten comparison between the E_4 and C_4 (Table 55) groups indicate that the E_4 groups teacher ratings on two of the five measures (effort, goal directedness) and the total measures are of statistical significance (p ranging from .05 to .001) when compared to the C_4 group.

Table 55

A Comparison between the E_4 and C_4 Groups on Teaching Ratings at the end of Kindergarten 1969-70

Measure	Grp.	N	YIEP	Mean	S.D.	t
Teacher Ratings						
Effort	E_4	22	2	3.32	0.72	3.85***
	C_4	20	0	2.40	0.82	
Persistence	E_4	22	2	2.59	0.85	1.25
	C_4	20	0	2.25	0.91	
Goal Directed-ness	E_4	22	2	3.09	0.75	2.44**
	C_4	20	0	2.40	1.05	
Independence	E_4	22	2	2.55	0.80	0.92
	C_4	20	0	2.30	0.92	
Fear of Failure	E_4	22	2	2.45	0.67	0.45
	C_4	20	0	2.35	0.81	
Total	E_4	22	2	13.95	2.97	1.95*
	C_4	20	0	11.70	4.33	

*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

Table 56 represents the post first grade comparison between the E_5 and C_5 groups on Teacher Ratings. The C_5 group on two of the five measures (independence and fear of failure) scored significantly better (p ranging from .05 to .001) than the E_5 group; however, there was not any statistical difference between the two groups on the total measure.

Table 56

A Comparison between the E_5 and C_5 Groups on Teacher Ratings at the end of First Grade, 1969-70

Measure	Grp.	N	YIEP	Mean	S.D.	t
Teacher Ratings						
Effort	E_5	17	2	3.18	1.01	0.80 NS
	C_5	20	0	3.15	0.99	
Persistence	E_5	17	2	2.88	0.78	-1.08 NS
	C_5	20	0	3.20	1.01	
Goal Directedness	E_5	17	2	2.71	0.77	-1.53 NS
	C_5	20	0	3.15	0.99	
Independence	E_5	17	2	2.53	0.72	-2.36*
	C_5	20	0	3.20	1.01	
Fear of Failure	E_5	17	2	2.35	0.86	-3.24***
	C_5	20	0	3.05	0.22	
Total	E_5	17	2	13.71	3.44	-1.67 NS
	C_5	20	0	15.75	3.99	

*p .05

**p .01

***p. .001

When comparing the E_4 and E_5 groups on post kindergarten Teacher Ratings (Table 57) there is not any statistical difference between the two experimental groups.

Table 57

A Comparison between the E_4 and E_5 Groups on Teacher Ratings at the end of Kindergarten.

Measure	Grp.	N	Years Tested	YIEP	Mean	S.D.	t
Teacher Ratings							
Effort	E_4	22	1970	2	3.32	0.72	0.14 NS
	E_5	21	1969	1	3.29	0.78	
Persistence	E_4	22	1970	2	2.59	0.85	-1.02 NS
	E_5	21	1969	1	2.86	0.85	
Goal Directedness	E_4	22	1970	2	3.09	0.75	0.54 NS
	E_5	21	1969	1	2.95	0.92	
Independence	E_4	22	1970	2	2.55	0.80	-1.12 NS
	E_5	21	1969	1	2.81	0.75	
Fear of Failure	E_4	22	1970	2	2.45	0.67	-0.57 NS
	E_5	21	1969	1	2.57	0.68	
Total	E_4	22	1970	2	13.95	2.97	-0.56 NS
	E_5	21	1969	1	14.48	3.09	

Table 58 represents descriptive data collected from Parent Questionnaires sent to the E_5 and C_5 parents. It is interesting to note that the E_5 parents return rate for the questionnaire was 88% compared to 60% for the C_5 group.

In relation to questions 2, 4, 6, the E_5 children do more schoolwork at home, bring more books home to read, and do more arithmetic problems than the C_5 group.

The E_5 and C_5 parents get information about their children by different means; (question 3) the E_5 parents by P.T. conference, phone calls, PTA meetings, and work he brings home; while the C_5 parents rely mostly on report cards and work he brings home.

Both the E_5 and C_5 parents at the end of first grade feel that Reading is the most important subject a child should learn in school (question 5).

Table 58

Descriptive Data - Parent Questionnaire

1. % replying E_5 $\frac{15}{17}$ = 88% C_5 $\frac{12}{20}$ = 60%

2. How often does your first grader do schoolwork at home?

	E_5	C_5
3 or more times a week	15	5
once a week	0	4
2 to 3 times a month	0	3

3. How do you get information about how your child is doing in first grade?*

report card	0	9
PT Conference	14	5
phone calls	3	1
PTA meetings	5	1
work he brings home	12	7

*parent could answer more than one.

4. How often does your first grader bring books home from school to read to you?

3 or more times a week	7	3
once a week	8	3
2 - 3 times a month	0	6
never	0	0
not sure	0	1

5. What do you feel is the most important subject a child should learn in school?

reading	11	10
writing	1	0
language	1	1
arithmetic	1	0
science	1	0
history	0	1

6. How often does your first grader do arithmetic problems at home?

3 or more times a week	14	3
once a week	0	4
2 - 3 times a month	1	2
never	0	1
not sure	0	2

Discussion

One of the most significant aims of this project is to determine and evaluate the effects of exposing groups of culturally deprived children to different lengths of specialized sequential educational programs.

The results of this study indicate that the children who participated in the Learning to Learn Program made significantly greater developmental gains over the two school years of the research program than those children who attended and participated in traditional educational programs. Both experimental groups after two years in the program were functioning in the upper limits of the average range of intelligence, with a percentile rank of 66 for those who began at age four and a percentile rank of 60 for those who began at age five. When comparing the E_4 and E_5 group to the Negro standardization sample of the Binet their percentile ranks were at the 97th and 98th percentile level respectively. The level of functioning of the two control groups was in the "Low Average" range for the C_5 group and the lower limits of the "Average" range of intelligence for the C_4 group with percentile ranks of 30 and 17, respectively. Both experimental groups after the first two years of the program have moved from a mental age lower than their chronological age to one greater than it.

The evaluation of the intellectual gains of the experimental groups over time revealed different developmental patterns for the children who began at age four and those who began at age five. The major intellectual gain for the E_4 group occurred during the first year of the experimental program when they gained nearly 20 IQ points. During the second year of the program the E_4 group maintained their gain from the previous year. This pattern

was also evident when the E_4 group was broken into upper, middle, and lower thirds based on Binet IQ at the beginning of the program. These three groups during the first year of the project gained 10.5 IQ points, (upper one-third); 24.4 IQ points (middle one-third); and 25.2 IQ points (lower one-third); compared to gains of only 2.5 IQ points (upper one-third); 3.2 IQ points (middle one-third); and a loss of 1.3 IQ points (lower one-third); during the second year of the project.

The intellectual gain of the children who began the program at age five showed a different pattern. After both the first and second years of the experimental sequential learning program the E_5 group displayed significant intellectual growth, with relatively equal IQ gain during each year of the program, (9.10 IQ gain 1st year; 7.37 IQ gain 2nd year). This pattern was also present when the E_5 group was broken into upper, middle, and lower third experimental groups, except for the lower third E_5 group. This group during the second year of the program lost nearly three IQ points. Thus a major difference between the two experimental groups exists after the first two years of the program. The lowest one-third of the E_4 group benefits from the experimental program and the lowest one-third of the E_5 group does not. The following two hypotheses offer possible explanations for the differential development between the two groups. First, the age of four may be a more critical period for compensating for the developmental lags which presumably has resulted from cultural deprivation. By the age of five, the children may be less able to compensate for this disadvantage; as well as having had an additional year with a lack of systematic developmental stimulation. It is apparent that the sequential learning format of the Learning to Learn Program has enhanced the intellectual development of the disadvantaged

children in this project.

The investigators are of the opinion due to the results of this project that intervention programs should be developed starting at age three to explore the possibility of achieving even greater growth in intellectual skills among the disadvantaged.

Language development has been described by the research literature as an area where disadvantaged children show marked deficits. The experimental and control children exhibited large deficits in language ability at the onset of this research project. The development of competence in this area is extremely important since academic achievement in our schools is highly related to and dependent on the capabilities of children to (1) express themselves, (2) comprehend written and spoken material, (3) acquire verbal reasoning ability, and (4) develop the ability to handle verbal concepts. The evaluation of the language area reveals some consistent results and some encouraging trends.

The E_4 group after the first year of the program demonstrated a marked superiority in language age over their control group. The data is presented and reported in terms of language age in order to make meaningful comparisons between each group of children and the standarization sample of the I.T.P.A. It also provides important information as to the language development status of each group in relation to chronological age. This pattern is consistent in relation to the intellectual functioning gain of the experimental group on the Stanford Binet. The E_4 group, however, still displayed marked deficits in two areas of language development; verbal reasoning ability and language comprehension. By the end of the second year of the sequential learning program these language deficits have been alleviated to the extent that the children's language age is equal to or only slightly below their

chronological age.

The E_5 group's language development patterns closely resembled their intellectual growth pattern of approximately equal language development over each year of the project. Their language ability has improved markedly while the language functioning of the control group has become more and more impaired. It should be pointed out however that the language age of the experimental children is still below their chronological age. The investigators are of the opinion based on the results of this study that age four is superior to age five for implementing programs dealing with the remediation and development of language.

Comparisons between the experimental and control groups on the Bender-Gestalt and the School Readiness Screening Test revealed that the experimental children during each year of the project performed significantly better than their controls. The consistency of these results over time for both experimental groups is important, especially when comparing the two experimental groups on these measures since the E_4 groups score significantly better than the E_5 group on both measures. The consistently higher performance of the experimental children who started at age four in the sequential learning program has a multidimensional characteristic. The investigators do not want to belittle the significant as well as practical gains of the E_5 group of children. However, it is felt from the research data to date that age four is a superior time to begin structured sequential learning programs for the culturally disadvantaged children. Moreover, in light of the consistent superiority (in terms of test results) of the E_4 group we feel that it would be of great value to study the effects of beginning the program at age three to determine if even greater gains can be made at this

earlier age.

The ability of the E_5 children to master the symbolic complexities of mathematics has been accomplished in this program. By the end of first grade this group of children has the ability not only to add and subtract but are able to make correct mathematical statements. The curriculum and methodological approach of the Learning to Learn program has succeeded in educating disadvantaged children in mathematical skills. Of utmost importance are the results obtained from the standarized achievement tests (Primary Mental Abilities, Metropolitan Readiness Test and Stanford Achievement Test) administered to both the E_5 and C_5 groups. On all subtests of the three achievement tests the experimental group significantly out performed their controls. The E_5 children are able to utilize and demonstrate their increased cognitive functioning on measures that are predictors of future educational success in our society.

The impact of the Learning to Learn program not only affected the cognitive style of the children in the sequential learning program, but has also instilled in these children a desire to learn. These children at the end of first grade would bring educational materials home to continue and supplement what was learned in school, while the control children would not.

The parents of the experimental children also are participating in more frequent contacts with the teachers and schools in regard to their children.

In summary, the Learning to Learn sequential learning program has had a serious and positive impact on the cognitive and educational skills of culturally disadvantaged children.

Conclusions from this Study

Since this is only the second year of a four year evaluation project, conclusions are necessarily limited; however, there is evidence from this study to support the following:

1. The E_4 culturally deprived children who attended the Learning to Learn Program made significantly greater progress developmentally during the two years of the program than a matched control group who attended Head Start Day Care Centers, and Title I kindergarten classes.

2. The E_5 culturally deprived children who attended the Learning to Learn Program made significantly greater progress developmentally during the two years of the program than the matched control group that attended a "traditionally" run kindergarten program, and first grade.

3. The E_4 Learning to Learn group made comparatively greater developmental progress at the completion of kindergarten than the E_5 Learning to Learn group.

4. The E_4 Learning to Learn group made their largest developmental gains during the first year of the project and maintained those gains during the second year of the program.

5. The E_5 Learning to Learn group made moderate developmental progress during each year of the experimental program.

6. The E_4 and E_5 Learning to Learn groups exhibit different developmental growth patterns in relation to cognitive functioning levels at the end of two years of the experimental program.

Conclusions relating to the Objectives and Hypotheses of the Evaluation Program

The first hypothesis was that group E_4 would be developmentally superior to group E_5 at the end of the Learning to Learn Preschool Program (through kindergarten). This hypothesis was confirmed as the E_4 group developmentally and statistically* out performed the E_5 group on the following measures:

*a) Stanford Binet IQ and MA

*b) Bender Gestalt

*c) School Readiness Screening Test

When comparing the E_4 and E_5 groups on the four subtests of the ITPA the E_4 group out performed the E_5 group on three of the four subtests. Even though these differences were not statistically significant (refer to Table 36) there exists a three to six months difference in language age between the E_4 and E_5 groups.

The second hypothesis was that group E_4 would be developmentally superior to the control group C_4 at the end of each year of the preschool program. This hypothesis was confirmed since the E_4 group was developmentally and statistically* superior to the C_4 group on the following measures at the end of each year of the program.

After Two Years of the Program

*a) Stanford Binet IQ and MA

*b) Visual Motor Association subtest of the ITPA

c) Vocal Encoding subtest of ITPA

*d) Auditory-Vocal Association subtest of the ITPA

*e) Bender Gestalt

*f) School Readiness Screening Test

g) Number of words, number of sentences and mean length of remarks on Stories

After the 1st Year of the Program

*a) Stanford Binet IQ and MA

*b) Visual Decoding subtest of ITPA

*c) Visual Motor Association subtest of ITPA

*d) Vocal Encoding subtest of ITPA

e) Auditory Vocal Association subtest of ITPA

f) Bender Gestalt

The third hypothesis was that group E_5 would be developmentally superior to control group C_5 at the end of the preschool program (post kindergarten) and the first grade. This hypothesis was confirmed as the E_5 group was developmentally and statistically* superior to the C_5 group on the following measures at the end of each year of the program.

After Two Years of the Program

*a) Stanford Binet IQ and MA

*b) Vocal Encoding subtest of ITPA

*c) Auditory Vocal Association subtest of ITPA

d) Visual Motor Association subtest of ITPA

e) Visual Decoding subtest of ITPA

*f) Bender Gestalt

*g) Primary Mental Abilities (all subtests)

*h) Metropolitan Readiness Test (all subtests)

*i) Stanford Achievement Test (all subtests)

j) Number of words, number of sentences, and mean length of remarks on Stories

*k) Language creativity

l) Mathematics performance Test

m) Parental Questionnaires

After the 1st Year of the Program

*a) Stanford Binet IQ and MA

*b) Visual Motor Association subtest of ITPA

*c) Auditory Vocal Association subtest of ITPA

*d) Bender Gestalt

*e) School Readiness Screening Test

Summary

This report is the two year follow-up evaluation of a proposed four year grant, studying the effects of a sequential learning program on disadvantaged children. Two groups of four- and five-year-olds were matched on several developmental variables, with one group at each age level entering the Learning to Learn Program at either the nursery or kindergarten level. The other two groups served as controls and entered either day care centers or "traditionally" run kindergartens. During the second year of the project the experimental groups either attended kindergarten or first grade at the Learning to Learn School and the control groups attended either Title I kindergarten or traditional first grade classes in public schools. Comparisons were made between the experimental and control groups after the first and second years of the program.

Results of the present study indicate that the E_4 Learning to Learn children who began the program at age 4 have made much larger developmental gains than their matched control group. The E_5 Learning to Learn children who began the program at age 5 have also advanced more rapidly than their matched control group; however, the developmental gains of the E_5 group are not as great as the developmental growth of the E_4 group.

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Individual Raw Data Collected for E_4 Group During 2 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 6 (Post Kindergarten) Spring 1970

Subject No.	Binet Pre N	Binet Post N	Binet Post K	ITPA VE Post N	ITPA VE Post K	ITPA VD Post N	ITPA VD Post K	ITPA AV Post N	ITPA AV Post K	ITPA VM Post N	ITPA VM Post K
1.	101	96	112	16	23	7	14	16	18	17	18
2.	95	127	120	12	14	2	12	13	20	11	15
3.	86	114	122	16	9	10	11	11	14	18	19
4.	73	93	93	8	19	1	10	5	13	12	14
5.	73	94	91	11	14	8	13	9	15	10	17
6.	87	107	107	14	19	12	13	11	17	15	15
7.	86	105	-	12	-	9	-	10	-	12	-
8.	80	124	118	9	12	9	14	9	15	6	18
9.	105	128	110	13	15	14	14	17	20	18	18
10.	111	118	107	11	10	8	14	7	14	19	17
11.	97	105	100	14	7	11	13	12	17	10	14
12.	86	107	122	9	11	12	13	17	21	11	16
13.	97	105	126	8	21	9	11	11	20	11	18
14.	109	117	135	12	14	7	13	17	21	17	18
15.	80	95	88	14	11	7	6	4	8	9	12
16.	90	107	113	10	8	10	12	13	13	14	21
17.	73	100	97	10	12	9	12	5	15	13	10
18.	99	98	104	7	18	7	12	14	20	12	18
19.	82	111	110	11	11	8	11	12	18	15	19
20.	84	101	94	10	20	8	14	7	11	15	16
21.	77	105	127	17	11	12	9	12	16	14	20
22.	74	109	93	16	14	2	10	4	16	13	20
23.	71	101	99	15	10	1	8	6	13	7	14

Individual Raw Data Collected for E4 Group During 2 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 6 (Post Kindergarten) Spring 1970

Subject No.	Bender Post N	Bender Post K	SRST Post K	Post - TEACHER'S RATINGS Effort K	Persist. K	Goal K	Indep. K	Failure K	Total K
1.	15	12	18	3	4	4	4	4	19
2.	21	13	24	3	3	4	3	3	16
3.	18	8	27	4	2	3	2	2	13
4.	15	7	16	3	2	2	2	2	11
5.	15	6	24	4	2	3	2	2	13
6.	17	11	25	3	2	3	2	2	12
7.	11	-	-	-	-	-	-	-	-
8.	16	12	21	4	4	3	3	3	17
9.	16	10	25	2	2	4	3	3	14
10.	16	12	19	3	4	4	3	2	16
11.	18	6	21	4	2	3	3	2	14
12.	17	11	25	2	3	4	3	3	15
13.	13	8	23	4	3	4	4	3	18
14.	21	9	29	3	3	3	3	3	15
15.	12	8	14	3	2	3	2	2	12
16.	14	9	22	4	2	3	2	2	13
17.	18	9	24	4	3	3	2	2	14
18.	13	7	26	4	3	3	3	3	16
19.	19	12	20	3	2	3	2	2	12
20.	25	14	14	2	1	1	1	1	6
21.	23	14	18	3	1	2	1	2	9
22.	9	14	18	4	3	3	3	3	16
23.	17	8	19	4	3	3	3	3	16

Appendix

Individual Raw Data Collected for E_4 Group During 2 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 6 (Post Kindergarten) Spring 1970

Subject No.	STORIES					
	Creativity	Abstraction	Language Quality	No. Words	No. Sentences	Mean Length of Remark
1.	4.0	3.5	3.5	149	9	6.95
2.	4.0	4.0	4.0	50	4	7.14
3.	4.5	4.5	3.5	65	6	9.29
4.	2.5	2.5	2.5	112	11	7.0
5.	3.5	3.5	3.5	101	8	7.77
6.	4.5	4.5	3.5	129	8	9.11
7.	-	-	-	-	-	-
8.	3.5	4.0	3.5	50	3	8.67
9.	3.0	4.0	3.0	47	6	6.25
10.	2.5	3.5	2.5	80	6	8.89
11.	4.5	4.0	4.0	177	10	9.72
12.	5.5	5.0	4.5	96	9	8.20
13.	4.0	5.5	4.5	459	20	10.62
14.	2.0	3.5	3.0	32	6	5.33
15.	5.5	5.0	5.0	129	13	8.73
16.	2.0	3.5	2.0	30	2	6.20
17.	1.0	1.0	1.0	17	0	2.13
18.	5.5	5.5	5.5	155	10	10.27
19.	2.0	3.0	3.0	74	8	7.50
20.	3.5	4.0	3.0	80	4	8.29
21.	4.0	5.5	4.5	120	8	9.38
22.	2.5	2.5	2.0	21	4	4.20
23.	4.0	4.5	4.5	358	27	7.37

Appendix

Individual Raw Data Collected for C_4 Group During 2 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 6 (Post Kindergarten) Spring 1970

Subject No.	Binet			ITPA							
	Pre N	Post N	Post K	VE Post N	VE Post K	VD Post N	VD Post K	AV Post N	AV Post K	VM Post N	VM Post K
1.	80	77		7	-	0	-	1	-	9	-
2.	89	90	99	12	17	6	8	8	8	12	19
3.	90	103	96	14	10	6	15	5	12	9	11
4.	95	82	96	4	19	9	13	9	16	14	17
5.	101	88	94	6	15	6	13	11	16	14	18
6.	105	91	99	13	18	10	16	9	19	12	19
7.	95	93	83	8	6	3	10	4	6	8	16
8.	79	81	82	2	11	2	10	1	9	1	10
9.	92	93	90	10	7	3	3	8	12	1	9
10.	82	71	79	6	11	1	8	1	6	0	17
11.	93	92	87	7	12	2	10	9	10	1	14
12.	82	77	88	5	10	2	6	6	11	5	12
13.	84	75	89	4	9	2	6	4	10	1	1
14.	85	78	91	4	9	1	11	0	8	4	13
15.	84	93	110	9	11	1	15	4	16	9	15
16.	79	72	91	8	16	6	11	6	19	11	20
17.	89	94	102	13	9	12	13	8	17	10	11
18.	82	78	97	3	8	1	15	2	15	12	17
19.	90	105	117	12	21	12	12	13	17	15	15
20.	83	91	90	10	11	4	14	13	15	12	19
21.	92	84	98	7	14	6	12	8	15	11	14

Individual Raw Data Collected for C_4 Group During 2 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 6 (Post Kindergarten) Spring 1970

Subject No.	Bender Post N	Bender Post K	SRST Post K	Post - TEACHER'S RATING Effort K	Persist. K	Goal K	Indep. K	Failure K	Tota K
1.	22	-	-	-	-	-	-	-	-
2.	14	15	21	3	2	4	3	2	14
3.	20	15	13	2	2	2	2	2	10
4.	18	13	19	4	4	4	4	4	20
5.	21	16	20	3	3	3	3	3	15
6.	18	12	21	3	3	3	3	3	15
7.	21	16	17	3	3	3	3	3	15
8.	28	14	6	2	2	2	2	2	10
9.	30	16	10	0	0	0	0	0	0
10.	30	20	13	2	1	2	1	2	8
11.	17	15	15	3	3	3	3	3	15
12.	30	18	15	2	2	2	2	2	10
13.	17	17	12	2	2	2	2	2	10
14.	30	21	12	2	2	1	1	2	8
15.	20	11	19	2	2	2	2	2	10
16.	19	18	17	3	3	4	3	3	16
17.	15	10	23	3	3	3	3	3	15
18.	21	15	18	2	2	2	2	2	10
19.	14	13	18	3	3	3	3	3	15
20.	17	15	20	2	2	2	2	2	10
21.	20	15	13	2	1	1	2	2	8

Appendix

Individual Raw Data Collected for C_4 Group During 2 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 6 (Post Kindergarten) Spring 1970

Subject No.	STORIES Creativity	Abstraction	Language Quality	No. Words	No. Sentences	Mean Length of Remark
1.	-	-	-	-	-	-
2.	2.5	2.5	3.0	34	4	7.0
3.	4.0	5.0	4.0	338	26	7.63
4.	2.0	2.5	2.5	43	4	8.40
5.	3.0	2.5	3.5	32	1	6.60
6.	4.0	5.0	3.5	81	6	5.50
7.	2.5	2.0	2.5	52	4	5.20
8.	2.0	1.5	2.0	25	3	4.40
9.	3.0	4.0	4.0	112	11	9.42
10.	4.0	5.0	3.5	217	16	7.72
11.	2.0	2.5	3.0	38	3	5.43
12	3.5	4.0	3.0	72	7	7.20
13.	2.5	2.5	2.5	57	5	4.27
14.	3.0	3.0	2.5	56	3	6.88
15.	3.0	3.5	3.0	22	4	5.50
16.	4.0	4.0	3.0	66	4	9.43
17.	3.0	3.5	4.0	84	10	5.53
18.	2.0	2.0	2.0	31	4	4.00
19.	3.0	4.0	4.5	133	19	4.89
20.	4.0	4.5	3.5	42	4	8.00
21.	5.0	5.0	5.0	44	5	7.33

Appendix
Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Binet Pre K	Binet Post K	Binet Post 1st	ITPA Pre VE K	ITPA Post VE K	ITPA Post VE 1st	ITPA Post VD K	ITPA Post VD 1st	ITPA Pre AV K	ITPA Post AV K	ITPA Post AV 1st	ITPA Post VM K	ITPA Post VM 1st
1.	91	102	-	9	15	-	14	-	8	22	-	15	-
2.	98	120	117	11	19	15	10	11	9	19	20	15	18
3.	96	106	120	10	14	17	12	13	11	21	22	16	23
4.	105	117	125	9	9	17	8	17	14	10	22	7	15
5.	82	91	-	7	11	-	14	-	7	12	-	12	-
6.	82	86	84	13	10	14	11	10	7	14	19	19	17
7.	105	103	114	10	7	20	9	16	11	18	20	19	15
8.	68	86	81	14	17	14	12	10	6	13	7	18	20
9.	90	96	-	10	10	-	15	-	10	8	-	13	-
10.	78	100	100	10	9	15	14	14	6	14	20	13	19
11.	100	112	121	6	12	14	11	14	7	18	21	11	15
12.	84	91	92	10	11	13	7	12	4	12	17	14	21
13.	99	105	104	8	13	15	10	10	7	16	21	17	13
14.	98	104	132	10	12	21	16	15	11	17	23	15	15
15.	92	105	120	8	12	18	15	13	9	17	21	14	19
16.	89	100	118	15	18	13	7	12	12	18	22	16	15
17.	93	108	120	4	13	17	10	16	8	19	20	20	17
18.	79	78	78	9	12	15	12	10	6	10	17	19	17
19.	78	82	81	12	8	24	12	15	8	16	20	16	16
20.	84	91	-	5	19	-	13	-	4	13	-	13	-
21.	93	92	98	6	16	20	7	13	8	14	19	17	14

Appendix

Individual Raw Data Collected for E_5 Group; during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Bender		Primary Mental Abilities Test				
	Post K	Post 1st	Verbal Meaning	Percept. Speed	Number Facility	Spatial Relation	Total Score
1.	13	-	-	-	-	-	-
2.	13	5	38	22	22	15	97
3.	11	6	41	28	23	17	109
4.	7	6	42	19	21	18	100
5.	8	-	-	-	-	-	-
6.	14	10	37	23	16	12	88
7.	9	7	25	22	23	20	90
8.	9	8	32	24	17	18	91
9.	11	-	-	-	-	-	-
10.	14	8	36	18	15	18	87
11.	12	4	37	18	19	19	93
12.	10	7	24	21	17	18	80
13.	17	3	35	18	18	16	87
14.	10	9	39	26	26	21	112
15.	9	3	36	23	21	18	98
16.	12	7	38	26	25	21	110
17.	11	3	39	24	21	19	103
18.	17	13	25	23	14	7	69
19.	13	6	22	26	19	19	86
20.	16	-	-	-	-	-	-
21.	15	7	33	18	17	13	81

Appendix

Individual Raw Data Collected for E_5 Group, during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Metropolitan Readiness Test						
	Word Meaning # Right Pre 1st	Listening # Right Pre 1st	Matching # Right Pre 1st	Alphabet # Right Pre 1st	Numbers # Right Pre 1st	Copying # Right Pre 1st	Total # Right Pre 1st
1.	-	-	-	-	-	-	-
2.	9	13	8	16	22	9	77
3.	8	10	10	16	16	8	68
4.	5	12	10	16	14	9	66
5.	-	-	-	-	-	-	-
6.	7	11	9	12	7	7	43
7.	7	11	12	16	16	9	71
8.	5	9	8	15	12	6	55
9.	-	-	-	-	-	-	-
10.	8	12	6	16	12	6	60
11.	8	9	9	16	13	9	64
12.	8	14	5	16	7	8	58
13.	5	14	5	16	17	5	62
14.	11	13	10	16	20	10	80
15.	8	12	7	16	16	5	64
16.	5	12	10	16	17	9	69
17.	7	12	13	15	19	4	70
18.	5	9	9	16	11	6	56
19.	5	10	8	15	17	11	66
20.	-	-	-	-	-	-	-
21.	4	12	9	16	14	4	59

Appendix
Individual Raw Data Collected for E_5 Group, during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No	Stanford Achievement Test: Word Reading # Right	Reading Grade Score 1st	Paragraph # Right	Paragraph Grade Score 1st	Vocabulary # Right	Vocabulary Grade Score 1st	Spelling # Right	Spelling Grade Score 1st	Wd.Study Skill # Right	Wd.Study Skill Grade Score 1st	Arithmetic # Right	Arithmetic Grade Score 1st
1.	-	-	-	-	-	-	-	-	-	-	-	-
2.	16	16	10	15	20	18	18	30	36	17	53	27
3.	15	15	13	16	28	26	12	21	27	14	51	26
4.	22	19	24	21	16	15	17	26	43	25	50	25
5.	-	-	-	-	-	-	-	-	-	-	-	-
6.	11	13	10	15	19	17	11	20	28	14	33	17
7.	17	16	19	18	15	14	17	26	30	15	50	25
8.	8	11	10	15	0	0	5	15	25	13	33	17
9.	-	-	-	-	-	-	-	-	-	-	-	-
10.	12	14	8	14	11	12	11	20	27	14	47	23
11.	19	17	17	17	23	21	18	30	34	17	46	23
12.	9	12	17	17	14	14	14	23	25	13	36	18
13.	12	14	11	15	13	13	11	20	35	18	51	26
14.	28	24	31	26	24	22	20	34	49	34	58	31
15.	18	17	13	16	17	15	10	19	30	15	57	30
16.	16	16	14	16	26	24	11	20	40	22	53	27
17.	23	20	19	18	23	21	19	34	38	20	54	27
18.	18	17	15	16	17	15	16	25	28	14	29	16
19.	15	15	12	15	17	15	13	22	31	15	43	21
20.	-	-	-	-	-	-	-	-	-	-	-	-
21.	25	22	24	20	18	16	18	30	35	18	44	22

Appendix

Individual Raw Data Collected for E_5 Group, during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	STORIES Creativity	Abstraction	Language Quality	No. Words	No. Sentences	Mean Length of Remark
1.	-	-	-	-	-	-
2.	3.5	4.0	3.5	40	7	4.44
3.	6.0	5.5	5.0	167	6	18.00
4.	5.0	5.5	5.0	112	6	12.89
5.	-	-	-	-	-	-
6.	2.5	3.0	3.0	29	4	4.67
7.	5.5	6.0	4.5	114	7	14.63
8.	2.0	2.5	2.0	19	1	3.80
9.	-	-	-	-	-	-
10.	4.5	5.0	3.0	77	4	10.71
11.	3.5	4.0	4.0	76	5	12.67
12.	5.0	5.5	3.5	240	17	10.26
13.	3.5	4.0	3.5	68	6	6.80
14.	4.5	5.0	4.5	136	9	14.44
15.	2.0	3.0	3.0	50	4	6.25
16.	4.0	4.5	3.5	92	6	13.14
17.	2.5	3.0	3.0	46	2	6.57
18.	4.0	4.5	4.0	60	5	8.29
19.	5.5	6.0	5.5	201	14	11.94
20.	-	-	-	-	-	-
21.	3.5	4.0	3.0	59	4	9.67

Individual Raw Data Collected for E_5 Group, during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Post - TEACHER'S RATINGS											
	Effort		Persist.		Goal		Independence		Failure		Total	
	K	1st	K	1st	K	1st	K	1st	K	1st	K	1st
1.	-	-	-	-	-	-	-	-	-	-	-	-
2.	4	4	4	3	4	3	3	3	3	3	18	16
3.	4	4	4	4	3	4	3	3	3	3	17	19
4.	4	4	4	3	3	4	3	3	3	3	17	17
5.	4	-	2	-	1	-	2	-	2	-	11	-
6.	2	1	2	2	2	2	2	2	2	2	10	9
7.	4	3	4	3	4	3	4	2	4	1	20	12
8.	4	1	3	1	2	2	3	1	2	1	14	6
9.	2	-	2	-	3	-	2	-	2	-	11	-
10.	2	4	2	3	3	2	2	3	2	2	11	14
11.	3	3	3	4	4	3	3	3	3	2	16	15
12.	4	3	3	3	2	2	4	2	2	2	15	12
13.	3	4	3	3	3	2	3	3	3	1	15	13
14.	4	4	4	4	4	4	4	3	4	4	20	19
15.	3	2	2	2	3	2	2	2	3	2	13	10
16.	3	3	2	3	4	3	4	3	3	3	16	15
17.	3	3	4	2	4	3	3	1	3	2	17	11
18.	4	4	3	3	3	2	3	3	2	3	15	15
19.	4	4	2	3	3	2	2	3	2	3	13	15
20.	3	-	2	-	1	-	2	-	2	-	10	-
21.	3	3	3	3	3	3	3	3	2	3	14	15

Appendix
Individual Raw Data Collected for C_5 Group; during
2 Years as Controls in Public Schools starting at Age 5
(Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Binet			ITPA									
	Pre K	Post K	Post 1st	Pre VE K	Post VE K	Post VE 1st	Post VD K	Post VD 1st	Pre AV K	Post AV K	Post AV 1st	Post VM K	Post VM 1st
1.	87	78	104	8	13	26	11	11	6	11	17	13	19
2.	97	93	87	19	11	11	10	15	12	19	20	15	18
3.	86	99	85	7	10	14	13	11	9	13	18	14	17
4.	98	98	110	11	11	20	15	14	10	13	17	19	20
5.	80	79	76	11	11	9	7	10	5	9	12	14	13
6.	88	60	83	9	11	10	12	13	7	11	11	10	19
7.	99	88	94	9	14	15	11	12	10	15	15	12	10
8.	77	78	78	5	7	14	13	13	5	12	14	13	14
9.	94	93	-	3	9	-	7	-	7	11	-	11	-
10.	79	91	94	8	13	12	6	7	6	12	15	17	22
11.	93	77	86	7	14	13	10	10	6	16	19	13	16
12.	97	96	89	16	15	17	13	18	13	16	17	17	14
13.	93	81	81	13	17	22	7	10	4	10	14	11	10
14.	98	92	94	13	22	16	10	14	14	14	17	9	23
15.	91	87	82	8	9	10	7	14	9	14	14	11	12
16.	103	111	82	13	18	13	15	12	14	20	21	18	20
17.	88	96	89	7	11	12	16	15	9	17	21	14	18
18.	98	110	82	14	19	16	6	6	13	14	18	13	12
19.	79	91	77	4	14	7	10	14	5	10	9	1]	12
20.	82	86	81	8	13	14	8	8	5	11	13	12	7
21.	75	63	69	8	13	7	12	8	0	6	1	11	9

Appendix

Individual Raw Data Collected for C_5 Group; during 2 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Bender		Primary Mental Abilities Test				
	Post K	Post 1st	Verbal Meaning	Percept. Speed	Number Facility	Spatial Relation	Total Score
1.	22	9	29	20	15	17	81
2.	3	1	36	25	21	23	105
3.	23	7	35	19	21	18	93
4.	18	13	42	15	12	18	87
5.	18	15	27	6	5	8	46
6.	21	10	22	13	9	14	58
7.	19	6	18	15	14	10	57
8.	14	4	34	23	20	18	95
9.	17	-	-	-	-	-	-
10.	16	11	33	18	17	14	82
11.	19	10	21	13	17	16	67
12.	15	2	37	21	17	20	95
13.	14	13	19	18	13	11	61
14.	15	12	31	19	13	13	76
15.	13	10	29	14	15	7	65
16.	9	3	37	22	24	19	102
17.	12	5	33	24	24	21	102
18.	22	12	31	17	19	8	75
19.	24	12	19	19	5	7	50
20.	13	16	29	12	11	10	62
21.	19	10	20	15	7	8	50

Appendix .
Individual Raw Data Collected for C_E Group; during
2 Years as Controls in Public Schools starting at Age 5
(Kindergarten Level) Fall, 1968 to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Metropolitan Readiness Test						
	Word Meaning # Right Pre 1st	Listening # Right Pre 1st	Matching # Right Pre 1st	Alphabet # Right Pre 1st	Numbers # Right Pre 1st	Copying # Right Pre 1st	Total # Right Pre 1st
1.	6	7	3	3	4	5	28
2.	10	13	14	11	10	14	69
3.	7	6	4	4	10	5	36
4.	5	13	7	1	5	1	32
5.	3	4	2	3	7	2	20
6.	6	4	4	5	6	1	26
7.	6	4	3	5	8	2	28
8.	5	6	11	6	8	8	44
9.	-	-	-	-	-	-	-
10.	6	6	3	4	8	0	27
11.	4	7	6	7	10	6	40
12.	4	10	6	14	12	7	53
13.	5	3	4	4	9	0	25
14.	1	9	7	12	7	4	40
15.	7	6	3	4	4	1	25
16.	6	8	11	15	15	8	63
17.	7	10	12	11	12	12	64
18.	3	9	2	4	8	0	26
19.	7	7	4	3	3	2	26
20.	4	9	7	2	7	0	29
21.	7	8	3	8	7	0	33

Appendix
Individual Raw Data Collected for C_5 Group; during
2 Years as Controls in Public Schools starting at Age 5
(Kindergarten Level) Fall, 1968 to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Stanford Achievement Test											
	Word Reading		Paragraph		Vocabulary		Spelling		Wd.Study Skill		Arithmetic	
	# Right 1st	Grade Score 1st	# Right 1st	Grade Score 1st	# Right 1st	Grade Score 1st	# Right 1st	Grade Score 1st	# Right 1st	Grade Score 1st	# Right 1st	Grade Score 1st
1.	11	13	8	14	19	16	0	10	19	12	12	11
2.	19	17	15	16	27	25	7	16	39	20	43	21
3.	5	12	11	15	9	11	2	12	15	11	21	14
4.	2	12	7	14	16	14	0	10	21	13	14	12
5.	9	12	5	12	10	12	0	10	15	11	9	11
6.	-	-	-	-	-	-	-	-	-	-	-	-
7.	9	12	7	14	15	14	0	13	22	13	19	14
8.	9	12	5	12	18	15	0	10	21	13	27	16
9.	-	-	-	-	-	-	-	-	-	-	-	-
10.	11	13	2	12	13	13	0	10	17	12	8	11
11.	8	12	5	12	9	11	3	13	26	14	23	15
12.	13	14	14	16	20	17	5	15	16	11	37	18
13.	7	12	4	12	9	11	2	12	19	12	19	14
14.	14	15	7	14	19	16	6	16	25	14	23	15
15.	12	14	5	12	12	12	0	10	10	11	7	11
16.	29	24	36	31	25	23	20	34	56	55	57	29
17.	12	14	16	16	13	13	4	14	16	11	42	20
18.	3	12	9	15	12	12	0	10	28	15	11	11
19.	7	12	2	11	9	11	0	10	20	12	15	12
20.	9	12	3	12	13	13	0	10	17	12	9	11
21.	10	13	5	12	13	13	2	12	21	13	12	11

Appendix

Individual Raw Data Collected for C_5 Group; during 2 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	STORIES					
	Creativity	Abstraction	Language Quality	No. Words	No. Sentences	Mean Length of Remark
1.	4.5	4.5	3.5	68	5	10.43
2.	5.0	5.0	3.0	22	1	11.00
3.	3.0	3.0	3.5	47	3	7.83
4.	3.0	3.0	3.0	67	6	6.18
5.	3.0	3.5	3.5	16	2	8.50
6.	2.0	2.5	2.5	40	3	2.63
7.	3.5	4.5	3.5	104	7	9.60
8.	3.0	3.5	3.0	24	2	4.80
9.	-	-	-	-	-	-
10.	1.0	1.0	1.0	17	0	5.67
11.	2.0	3.5	3.0	72	6	6.27
12.	5.5	5.5	5.0	72	5	15.60
13.	4.0	4.0	3.0	67	3	8.38
14.	2.5	3.0	3.0	48	4	8 17
15.	4.0	4.5	4.0	25	4	6.25
16.	2.0	3.0	3.0	37	4	5.29
17.	4.5	4.5	4.0	58	3	19.33
18.	4.0	5.0	4.5	110	6	8.38
19.	2.5	4.5	2.5	49	3	2.53
20.	4.0	5.0	4.0	154	11	9.94
21.	2.5	4.5	3.0	110	8	10.90

Appendix

Individual Raw Data Collected for C_5 Group; during
2 Years as Controls in Public Schools starting at Age 5
(Kindergarten Level) Fall, 1968 to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Post - TEACHER'S RATINGS											
	Effort		Persist.		Goal		Independence		Failure		Total	
	K	1st	K	1st	K	1st	K	1st	K	1st	K	1st
1.	3	2	2	2	2	2	2	2	2	3	11	11
2.	4	4	4	4	4	4	4	4	3	3	19	19
3.	4	4	4	4	3	4	3	4	4	3	18	19
4.	1	2	1	2	1	2	1	2	1	3	5	11
5.	2	2	2	2	2	2	2	2	2	3	10	11
6.	3	2	3	2	2	2	3	2	3	3	14	11
7.	3	4	3	4	2	4	2	4	2	3	12	19
8.	3	4	3	4	3	4	3	4	2	3	14	19
9.	-	-	-	-	-	-	-	-	-	-	-	-
10.	1	4	1	4	1	4	1	4	1	3	5	19
11.	2	4	1	4	2	4	3	4	3	3	11	19
12.	4	4	4	4	4	4	4	4	3	3	19	19
13.	3	4	3	4	3	4	2	4	1	3	12	19
14.	4	4	4	4	4	4	3	4	3	3	18	19
15.	1	2	1	2	1	2	2	2	3	3	8	11
16.	4	3	4	4	4	3	3	4	3	4	18	18
17.	4	4	4	4	4	4	4	4	4	3	20	19
18.	2	2	2	2	2	2	2	2	3	3	11	11
19.	2	2	2	2	2	2	2	2	1	3	9	11
20.	3	2	3	2	3	2	2	2	1	3	12	11
21.	2	4	1	4	2	4	1	4	1	3	7	19